Saskatchewan Agriculture

Saskatchewan Livestock Association

What's in Stock for You?

Putting Beef Breeding Into High Gear

ACKNOWLEDGMENTS

Papers are not exactly as delivered at the beef seminar. They have been edited from taped transcripts of the talks plus written papers where provided. Every attempt was made to ensure accuracy and preserve the intent of what the speaker said.

We would like to express our thanks to all who attended What's in Stock for You? 1984. The speakers did an excellent job. The beef industry owes a great deal to these researchers and industry leaders.

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We thank you all for the success of the program.

The Organizing Committee

Correction Notice

Page 15 is out of sequence and should be read following page 72. Sorry for the inconvenience.

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PUTTING "BEEF BREEDING INTO HIGH GEAR

Dr. Roy Berg, Dean of the Faculty of Agriculture and Forestry, University of Alberta

Everything is genetic. You can go anywhere you want with breeding and change anything you want. The wide variety in cattle is all genetic. We have a fantastic range to work with. All we've done is select until we get what we call improved. What we have to remember is all cattle breeds are "exotics" except buffalo and musk-ox. The rest were imported.

The large lean breeds come from Europe. Why did the French go for this kind of animal? One is because they liked meat. Piedmontese cattle are double muscled. This type started as an abnormality but farmers started breeding for it. Double muscled cattle give producers more red meat. From a 1,000 lb. steer you get about 330 lbs. of red meat. From a double muscled steer you would get up to 500 lbs. of red meat. Belgian and French producers get nearly twice as much red meat for the animal live weight.

Some definitions:

1. phenotype - what you see
2. genotype - what you pass on
3. genes - a unit in cells that control the inheretance of one or more characteristic.
4. chromosome - the package in the cells that hold the genes.
5. diploid - an animal with two sets of chromosomes.
6. heterosis - an offspring having more vigor than either parent; depends on genetic diversity of the parents i.e. how "different" the two sets of chromosomes are from each other.

For reproduction you need a bull and a cow - both are equally important. The combination of their characteristics will result in an offspring which is totally different. So you don't need just a superior cow or a superior bull. You must consider the combination.

People have 46 chromosomes (23 pair); cattle have 60 (30 pair). If you want to compare reproduction to a deck of cards - when you take a random sample of genes you'll never get the same hand twice. However, we can stack the deck somewhat by attempting to control what genes are on the chromosomes.

To understand how we can change characteristics we must understand how protein is made and its importance. Proteins are the building blocks of organs and tissues in the animals. When you make changes in protein in animals you make changes in phenotype, that is in such characteristics as homones, color, shape, size, horns and reproductive traits.

A substance called DNA controls the kinds and amounts of proteins made in the cells. DNA contains the code for how proteins are to be made. Other substance called RNA read the code and assemble the chemicals needed to make the protein. The information contained in DNA is passed on from parent to offspring.

If the genetic material (DNA) an animal gets comes from slightly different parents, the resulting offspring is better.

There are two different theories of breeding: inbreeding and outbreeding (or crossbreeding). Inbreeding to some people means purity. By mating related

animals the genetic diversity of the chromosomes passed on to the offspring is reduced. The purest thing we have are bacteria and viruses and those sorts of things but they don't have much variety. Only diploid organisms become complex, developed, differentiated - the so-called higher animals. Inbreeding narrows the choice - all the players from one town so to speak.

Outbreeding or crossbreeding widens the genetic choice, and increases the size of the deck. Selection gives favourable genetic response and allows you to go in any direction you want. Selection and inbreeding are opposing forces. If your selection is stronger than your inbreeding you might be able to make progress.

You can avoid inbreeding by staying in a large population - having a large number of bulls and cows. If you have a one-sire-herd it shouldn't be closed. Even a 20 sire herd shouldn't be closed completely. People still believe inbreeding is a really good thing. Mostly because of lack of observation and comparison. You should compare under the same conditions and circumstances.

Cattle breeding is like a football game. You try to get the best genes through the whole team. A football coach can see what he is working with when he chooses among all his players. A farmer is trying to do the same thing with his breeding program but he can only see the results - it's like working in a black box. The cattle breeder has to select on the basis of the end product - the phenotype or what he sees: color, size, shape, performance.

A football team has an offence and a defence, like the pairs of chromosomes in a diploid animal. The result equals a better team. Inbreeding is like one player playing offence and defence. Outbreeding gives you two players at each position, each specializing - doing slightly different jobs so that in total you have a better team.

If we compare weaning weights, crossbred calves from straight-bred cows weigh 8.5 per cent more than straight-bred calves from straight-bred cows. Crossbred calves from crossbred cows (bred to a third breed bull) weigh 23.1 per cent more than the straight-bred calves.

A crossbred cow is the key to a crossbreeding program. You're not really crossbreeding unless you have a crossbred cow. It's the maternal traits that count - to have a calf every year, have it early, recycle and have a calf early again next year.

The three-way terminal cross in this example is theoretically a good system but it's hard to maintain in practices. You have to have three different herds - 25 per cent one breed for straight-bred replacements, 25 per cent to produce the crossbred cows and 50 per cent crossbred cows to breed to a third breed to go to market. Only half the herd would be operating at the 23 per cent weight increase, resulting in only a 14 per cent improvement in the whole system. The problem is trying to improve the production of the straight-bred base.

On way to get improvement is to use the rotational system. Use two breeds, switch sires every generation and get about a 15 per cent increase in weaning weight. If you put in a three breed rotation, you get about a 20 per cent increase in weaning weight and approach the weights of the tests.

The name of the game is fitting the breeds into a good commercial crossbreeding program. You need good cows and you need good bulls - some breeds will fit into each category. Breeds now advertise characteristics their animals can pass on.

How do you use these breeds? You only need three or four breeds for a good breeding program, not the 40 or 50 breeds in Canada today. So we can remake these breeds into something more useful for our purposes. This is what we call building synthetic populations. And once you build a synthetic population you don't stop there. It's a continuing process and shouldn't stop.

We set up a breeding program in 1960 at the University of Alberta ranch at Kinsella. We wanted to set up a program where we were selecting cattle for performance and productivity under commercial range and feedlot conditions. We were going to compare two systems of breeding - straight-bred Herefords as a control and a multibreed beef synthetic.

The Beef Synthetic (SY) is made up of Angus, chosen on carcass reputation and maternal qualities; Charolais, because they were the only lean exotic at that time and Galloway because we thought they were winter hardy. The Galloway wasn't an ideal choice for winter hardiness because it has long hair and no undercoat. The undercoat is what provides the insulation. So the Galloway is good for wet cold but not dry cold. Since 1970 the Beef Synthetic breed (SY) has been fairly stable at 1/3 Angus, 1/3 Charolais, 1/5 Galloway, 5 per cent Brown Swiss, 3 per cent other (table 1).

In 1968 we started another synthetic based on dairy breeds: Holstein, Brown Swiss and Simmental bred to our surplus Herefords. The Simmental is considered a dual purpose breed in Europe. In 1982 the Dairy Synthetic (SD) breed was about 60 per cent dairy breeding and 40 per cent beef breeding (table 2).

The University ranch is managed as a practical low cost commercial operation. The breeding herd is on range year round and depends on natural grazing except for three or four months in winter. Yearling and two year old heifers are separated from the older cows in the winter. Two-year old heifers are calved separately and more closely supervised than the older cows. Breeding is in July and August and calving mainly April and May.

Calves are weaned in October or November when they are put on a performance test for about five months. Bull calves are self fed a high concentrate ration and heifers are limited to 5 lbs. concentrate and 5 lbs. hay per head daily plus straw.

Bulls for breeding have been selected at a year of age on the basis of both preweaning and past weaning gain. No other selection criteria are used. Occasionally a selected bull may be culled for a physical abnormality or impairment. Selected bulls are used for breeding as yearlings and approximately one in four are used again as two year olds.

Heifers are selected to emphasize reproductive traits. All physically sound yearling heifers are exposed to bulls for a two month breeding season. Those that don't conceive are fed out to slaughter. After this a breeding female must wean a calf each year to stay in the herd. Cows are also culled for bad udders, lameness, temperament and poor condition. After they have weaned three calves they are also culled on basis of calf weaning weight.

The management system designed to test cows for their ability to adopt to natural conditions and minimum supplementary winter feeding, puts pressure on reproductive performance.

Overall calf crop born based on number of breeding females exposed to bulls was 83 per cent for Beef Synthetic, 82 per cent for Dairy Synthetic and 78 per cent for the Herefords. Losses from birth to weaning reduced the calf crop by 7 per cent for the Herefords, 6 per cent for the Beef Synthetics and 4 per cent in the Dairy Synthetics (table 3).

Cow productivity based on weight of calf weaned per cow exposed was 142 per cent for the Dairy Synthetics, 128 per cent for the Beef Synthetics compared to the Herefords at 100 per cent.

Birth weights have increased in all three lines by about 0.5 lb. per year (figure 1) and is correlated to selection for growth and yearling weight. Increases in the 180 day weight have been similar over the 20 years of the program for Hereford and Beef Synthetic calves at about 4.4 lbs per year or 88 lbs. in total (table 4) and (figure 3).

Increase in yearling weight of Hereford males was 4.4 lbs. per year and for the Beef Synthetic males about 10 lbs per year. Over a shorter period Dairy Synthetic males showed an increase of 11 lbs. per year in yearling weight (table 4 and figure 3).

Heifer weights increased slowly in all three lines since no direct selection was placed on it and represents a correlated response to selection of males at a year of age (table 4 and figure 2).

In feeding trials of 140 days, Beef Synthetic bulls had the fastest daily gain (3.46 lbs.) followed by Dairy Synthetic (3.22 lbs.) and Herefords (2.95 lbs.). Hereford bulls had best feed conversion on a liveweight basis (5.17 lbs.) followed by Beef Synthetic (5.37 lbs.) and Beef Synthetic (5.76 lbs.) (table 5)

However the Herefords had the lowest dressing percentage (table 6). Since the cull bulls are often used for various nutritional and management experiments they are not always marketed at the best stage to get the highest grade so table 6 does not necessarily represent the potential of the breeds.

Over the year, Kinsella bulls have been tested at the Alberta Performance Test Center at Ellerslie. For growth rate, the Kinsella Herefords, the control group, have exceeded other Herefords on test at the station. The synthetic bulls have generally equalled the gain of the larger European breeds. Kinsella synthetics gained about half a pound a day more than Simmentals and just under half a pound a day more than Maine Anjou bulls which were the largest, fastest growing breeds tested (table 7).

Beginning in 1978, a test project was started at Kinsella in which the progeny of selected industry Hereford sires from the Alberta Hereford Sire Test program were compared to progeny of Kinsella's Hereford sires. After four years of testing, we found that the birth weights, preweaning average daily gain and weaning weights were very similar. We conclude the University of Alberta Kinsella Hereford sires are equal to selected industry sires in the performance of their progeny. Selecting for weight has not affected the program (table 8).

Results of 20 years of selection in synthetic and control HE populations lead to the conclusions that synthetic populations provide an opportunity to capitalize at the outset on hybrid vigor and complementarity from foundation breeds and a subsequent increased response to selection from the broader genetic base provided.

Question - The bottom line is the dollars and cents involved. The important thing is conception to

finished animal. Are you doing any work looking at the total cost of raising a calf on feed conversion during the total cycle.

We've done up to slaughter, but haven't been able to do the cost of the total picture. We've done some work on the cost of maintainence of a cow - how much to keep a cow alive in the winter. We should measure everything for costs. We've looked at total confinement in Ontario where we feed as much as is needed. In that case it paid to have a bigger cow, and a heavy milker.

The optimum cow varies from farm to farm, depending on the range, feed, and temperature. The ideal is to have a calf every year, early in the year. Hereford liveweights were the most efficient feed converters. However on carcass, the two synthetics were better. Dr. Berg's discussion of the breeding program at Kinsella has been published in greater depth in the 62nd Annual Feeder's Day Report, June, 1983 (from which much of this paper has been abstracted).

Table 1. Average breed percentages in Beef Synthetic calves born at Kinsella from 1962-1982.

Breed	*1962*	*1966*	*1970*	*1974*	*1976*	*1978*	*1980*	*1982*
Angus	41.4	41.6	37.6	36.0	35.7	35.7	37.0	36.8
Charolais	16.8	29.8	35.1	34.4	33.7	34.7	33.2	34.1
Galloway	40.3	26.4	20.3	21.4	21.0	21.7	21.0	20.6
Brown Swiss		0.6	4.7	4.2	4.8	4.5	5.2	5.2
Others[1]	1.5	1.6	2.3	4.0	4.8	3.4	3.6	3.3

[1]Includes Hereford, Holstein, Jersey and Brahman.

Table 2. Average breed percentages in Dairy Synthetic calves born at Kinsella from 1968-1982.

Breed	*1968*	*1970*	*1972*	*1974*	*1976*	*1978*	*1980*	*1982*
Holstein	90.0	63.4	45.6	34.4	34.9	27.4	28.1	30.5
Brown Swiss		17.5	24.7	30.1	32.4	27.3	23.9	22.5
Simmental					2.1	9.4	8.2	7.2
Others[1]	10.0	19.1	29.7	35.5	30.6	35.9	39.8	39.8

[1]Includes Angus, Galloway, Hereford, Charolais and small amounts of Guernsey, Jersey and Brahman.

Table 3. Cow reproduction and production by breed – 1962-1982 Kinsella.

Breed	*Line*	*1962*	*1966*	*1970*	*1974*	*1978*	*1979*	*1980*	*1981*	*1982*	*Overall*[1]
No. of cows exposed	HE[2]	71	124	122	108	77	90	80	86	77	94
	SY	79	164	164	172	197	194	189	199	207	176
	SD			28	40	47	70	95	118	119	65
Calf crop born, %	HE	75	64	73	75	90	79	78	86	79	78
	SY	86	78	79	86	90	84	82	84	86	83
	SD			79	80	85	85	83	81	75	82
Calf crop weaned, %	HE	69	59	72	68	84	63	66	79	74	71
	SY	82	74	76	74	84	75	71	82	77	77
	SD			79	75	80	83	76	77	68	78
Avg. age at weaning, days	HE	144	168	160	169	164	166	157	166	151	159
	SY	150	172	163	173	170	168	161	175	154	163
	SD			151	172	164	172	164	170	156	162
Avg. calf wt. Oct., kg[3]	HE	127	169	163	161	172	170	180	193	172	166
	SY	161	191	198	196	210	209	212	206	195	196
	SD			206	210	226	219	227	220	200	214
Wt. of calf/cow exposed, kg	HE	88	100	117	110	145	108	119	153	127	118
	SY	131	141	151	146	177	158	150	170	151	151
	SD			162	157	183	181	172	166	136	167

[1]Equal weight to each year.
[2]All HE cows were purebred but some of their calves were crossbred.
[3]Actual weight taken at weaning in October.

Table 4. Weights and adjusted weights of calves from 3 lines – 1962-1982, Kinsella.

Sex	*Breed*	*1962*	*1966*	*1970*	*1974*	*1978*	*1979*	*1980*	*1981*	*1982*	*Trend kg/yr*
Birth wt., kg											
Male and	HE	31.8	32.6	32.6	33.1	35.1	37.8	37.1	35.0	35.1	0.17
female	SY	33.1	34.0	34.0	35.8	37.8	38.8	38.5	38.2	38.1	0.25
	SD			34.5	38.6	41.4	41.0	42.2	41.6	39.0	0.34
Adjusted 180 day wt., kg											
Male	HE	155	181	194	181	195	195	213	218	212	2.20
	SE	207	212	232	217	237	244	254	238	243	2.23
	SD			242	239	266	252	257	246	243	0.94
Female	HE	166	175	175	178	188	187	204	189	206	1.89
	SY	190	202	214	211	223	224	232	216	224	2.07
	SD			216	218	237	225	247	232	229	0.92
365-day wt., kg											
Male	HE	238	387	406	348	418	420	457	422		2.02†
	SY	296	426	453	401	488	499	512	485		4.36†
	SD			438	405	531	520	505	514		5.18
540-day wt., kg											
Female	HE	338	369	368	308*	343	376	390	367		0.78
	SY	365	402	405	363*	385	409	414	408		1.40
	SD			394	375*	396	415	430	434		0.46

*Hay only fed to heifers during winter.
†Calculated from 1966-1981.

Table 5. Average daily gain on feed and feed conversion (140-day, Kinsella) for Hereford, Beef Synthetic and Dairy Synthetic bulls, 1977-1980.

	Age at end of test	*No. of animals*	*Initial wt., kg*	*Final wt., kg*	*Avg. daily gain, kg*	*Avg. Daily feed, kg*	*Feed Conversion*
Hereford							
1977	346	33	189	365	1.26	6.71	5.33
1978	327	11	179	370	1.36	7.20	5.28
1979	318	20	178	365	1.33	6.59	4.96
1980	340	17	198	404	1.47	7.48	5.08
Weighted avg.	335	81	187	374	1.34	6.91	5.17
Beef Synthetic							
1977	347	63	217	415	1.41	7.54	5.35
1978	333	73	211	445	1.67	9.07	5.44
1979	325	57	225	446	1.58	8.29	5.26
1980	339	56	224	450	1.61	8.73	5.42
Weighted Avg.	336	249	219	439	1.57	8.43	5.37
Dairy Synthetic							
1977	340	21	230	408	1.27	7.59	5.98
1978	323	13	242	453	1.51	9.20	6.10
1979	328	15	238	466	1.63	8.69	5.33
1980	342	19	240	450	1.50	8.53	5.69
Weighted avg.	335	68	237	441	1.46	8.40	5.76

Table 6. Growth and carcass characteristics of cull bulls for 1977-1981 calf crops, Kinsella.

	No. of animals	Avg. age, days	Live plant wt., kg	Hot carcass wt., kg	Dressing %	Live wt/day, kg	Carcass wt/day, kg	Fat cover cm	Loin eye area, sq. cm	A1	A2	A3+ A4	B+C
Hereford													
1977	23	475	522	307	58.87	1.10	0.65	1.50	81.5	30.4	26.2	21.7	21.7
1978	14	356	380	216	56.98	1.07	0.61	1.00	61.0	42.9	28.6		21.4
1979	13	470	531	310	58.38	1.13	0.66	1.77	72.5		23.1	15.4	61.5
1980	10	544	610	365	59.72	1.12	0.67	1.63	84.7	50.0	20.0	20.0	10.0
1981	14	407	459	266	57.97	1.13	0.65	1.03	76.5	64.4	7.1	7.1	21.4
Avg.	74	448	497	291	58.49	1.11	0.65	1.38	75.6	36.5	21.6	14.9	27.0
Beef Synthetic													
1977	44	471	557	334	59.93	1.18	0.71	1.01	81.3	61.4	6.8	2.3	29.5
1978	59	460	580	348	60.03	1.26	0.76	1.07	94.2	57.6	5.1		37.3
1979	39	494	601	367	61.13	1.22	0.74	1.23	90.7	53.8	2.6	10.3	33.3
1980	39	534	675	415	61.50	1.26	0.78	1.44	94.2	33.3	23.1	20.5	23.1
1981	36	393	505	299	59.31	1.28	0.76	0.78	86.0	75.0			25.0
Avg.	217	470	584	353	60.42	1.24	0.75	1.11	89.6	56.2	7.4	6.0	30.4
Dairy Synthetic													
1977	17	498	596	350	58.65	1.20	0.70	0.82	92.3	70.6			29.4
1978	9	369	466	274	58.88	1.26	0.74	0.58	73.8	44.4			55.6
1979	19	477	602	353	58.69	1.26	0.74	1.14	85.8	57.9	5.3	10.5	26.3
1980	19	549	660	393	59.55	1.20	0.72	1.04	92.8	63.2	10.5	5.2	21.1
1981	31	405	550	323	58.84	1.36	0.80	0.73	84.7	67.7	6.5		25.8
Avg.	95	462	583	343	58.94	1.26	0.74	0.88	86.9	63.1	5.3	3.2	28.4

Table 7. Performance results from the Alberta bull test center, Ellerslie, 1981-1982.

Breed[1]	No. pens	Avg. final wt. kg	Avg. final wt. lb.	Avg. daily gain kg	Avg. daily gain lb.	Feed/gain
U of A-SY	1	507	1116	1.81	3.98	6.22
U of A-SD	1	515	1133	1.80	3.95	6.69
SM	4	555	1220	1.62	3.56	7.51
MA	2	556	1223	1.58	3.48	7.17
HE	5	478	1051	1.38	3.04	7.26
AN	5	455	1000	1.32	2.90	7.46
MG	1	451	993	1.22	2.68	8.49

[1]SM-Simmental, MA-Maine Anjou, HE-Hereford, AN-Angus, MG-Murray Gray.

Table 8. Means and standard errors for performance of progeny of University of Alberta HE sires and selected Alberta HE test sires.

Sire group	No. sires	No. calves	Birth wt., kg	Preweaning ADG, kg	Adj. 180-day weaning wt., kg
U. of A.	20	380	37.4 ± 0.8	0.949 ± .01	208.3 ± 2.5
Test sires	24	272	36.9 ± 0.7	0.943 ± .01	206.8 ± 2.6

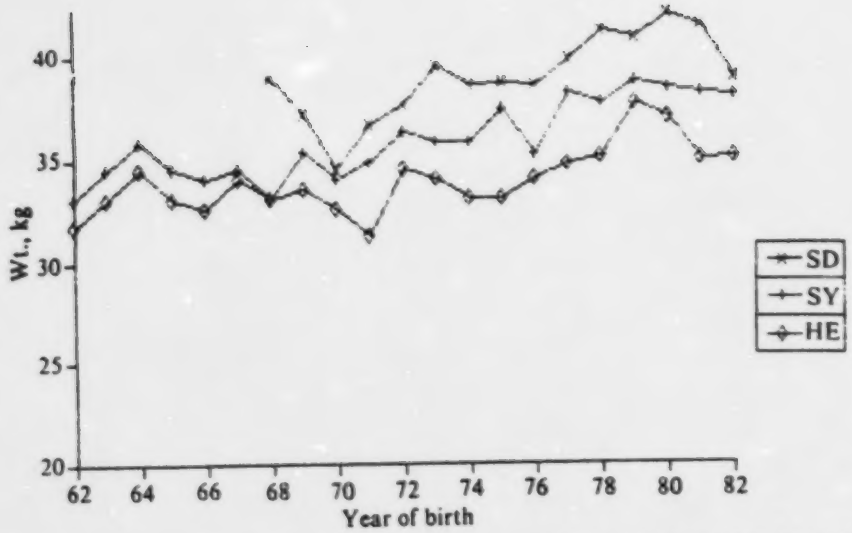

Figure 1. *Average birth weights of calves of three lines from 1962 to 1982, Kinsella.*

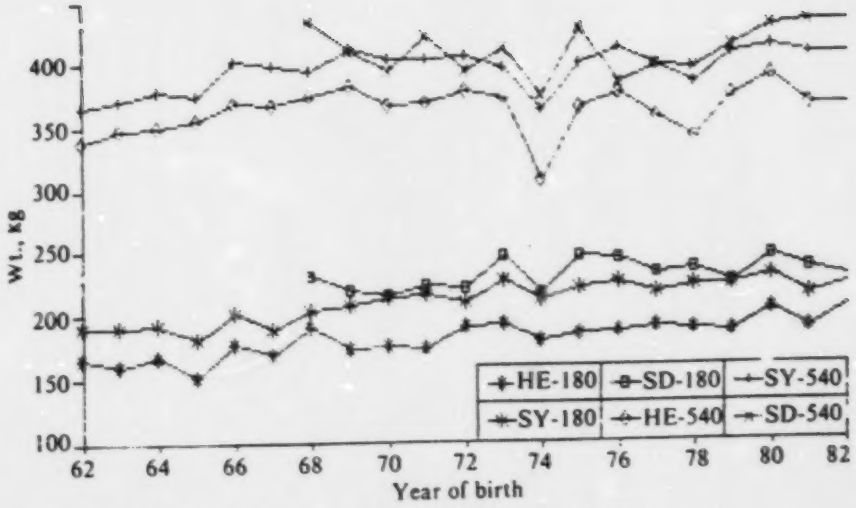

Figure 2. *Weights of heifers from three lines (Uppper 540-day wt. Lower 180-day wt .*

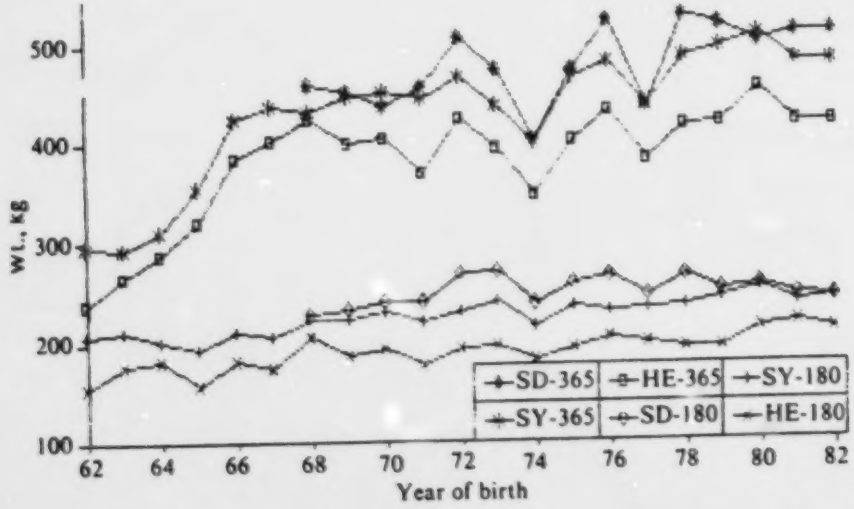

Figure 3. *Weights of males from three lines (Upper 365-day wt. Lower 180-day wt.).*

EQUIPMENT CHOICES FOR LOW LABOR FEEDING

G.E. Padbury, Livestock Facilities Specialist, Saskatchewan Agriculture

You should select a complete forage feed system, including the cutting, packaging, hauling, storing and feeding system. This way, all pieces of equipment are matched for an economical, efficient system to suit your personal preference.

Conditions in this selection should include:

- long term plans
- capital costs
- annual costs (equipment and labor)
- labor (hours and number of persons)
- feed losses (field, storage and feed)
- feed nutrients and pallatability
- convenience
- efficiency
- personal preference
- expected net return on investment.

References

Time permits us to compare only a few complete feed systems. Many more systems are compared in much more detail in publications. Some of these are:

- Forage Harvesting, Hauling and Comparisons (based on a five year on-farm study in Manitoba, cost comparisons by Saskatchewan Farm Management)

- Beef Cattle Feeding Systems and Comparisons (based on a three winter on-farm study in Saskatchewan, cost comparisons by Saskatchewan Farm Management)

- Chaff Systems and Comparisons (based on a one season on-farm study in Saskatchewan, cost comparisons by Saskatchewan Farm Management)

- Finishing Cattle on the Family Farm bulletin

- Plans and Publications list from Saskatchewan Agriculture.

The cost comparisons were prepared by Wayne Holt, management specialist with Saskatchewan Agriculture.

If you are interested, I suggest you make use of this information in consultation with your local agricultural representative and regional specialists in farmstead engineering, farm management and livestock.

COST COMPARISONS OF SYSTEMS

The total cost of forage per equivalent ton of feed can be a major factor in selecting a complete forage system for your beef cattle operation. Cost comparisons are detailed below:

table

System		Item	Capital	Per Equivalent Ton Tons Fed	
				100 Tons	300 Tons
ELECTRIC WIRE	1	20' SP windrower (15%)	$ 3,100	$ 5.90	$ 2.90
		Large round baler	13,300	24.80	10.30
		3 ton truck flat bed (15%)	5,600	10.60	5.30
		Feeding	100	2.20	2.00
	Hay	TOTAL	$22,100	$43.50	$20.50
	2	Chaff wagon & blower			
		Loose stacker	$10,250	$27.60	$17.50
		Feeding	100	2.40	2.20
	Chaff	TOTAL	$10,350	$30.00	$19.70
FEED CAGES		Windrower, large round baler & 3 ton truck as in 1	$22,000	$41.30	$18.50
		Feed cages (300')	2,550	9.80	7.80
	Hay	TOTAL	$24.550	$51.10	$26.30
	3	15' S.P. windrower (15%)	$ 2,800	$ 5.80	$ 3.10
		Forage harvester	12,600	26.00	12.30
		Hi dump silage wagon	8,100	29.70	15.40
		+ 2 trucks (15%)	6,660		
		Packing silage	1,500	6.70	4.90
		Feed cages (300')	2,550	9.80	7.80
		Bunker silo 300 tons 66% m.c.	10,000	5.30	5.30
	Bunker Silo	TOTAL	$44,210	$83.30	$48.80
	4	Windrower, forage harvester, Hi-dump wagons, trucks & feed cages as in 3	$32,710	$71.30	$38.60
		Plastic bag machine	31,000	50.20	21.80
	Plastic Bag	TOTAL	$63,710	$121.50	$60.40

Capital costs as of July, 1982, for haying and feeding systems and June, 1983 for chaff systems.

CHAFF: A KEY IN UTILIZING MIXED FARMS TO THEIR FULLEST POTENTIAL

Leo Radekop, producer, Watrous

Low cost efficiency is for everyone, not just the producer on his last financial leg.

The traditional ways of increasing profits from beef cattle through expansion and automation usually add problems: you have to invest a large amount of money; you usually reduce the profitibility of the grain part of the farm; and often automation reduces future options.

The ideal solution is to have the whole system make a profit. Grain and beef operations can't be separated in a mixed farm. Here are some comparisons:

System one - grain operation

1,500 cultivated acres, 1,000 seeded, 500 summerfallow, sale of grain at 29.2 bushels per acre - $83.30
Cash Costs - 56.60
Return per acre - $26.70
No investment costs were included in this example, add a herd of 80 head and see what happens to the returns.

System two - same farm

120 acres devoted to hay
Sale of cows - $269.00
Costs/acre, cash costs, capital costs, cattle and equipment - 213.00
Net profit per acre - $ 56.00

But we have to consider the net effect of system two on the overall grain operation.

System two profit - $ 56.00

Total profit on 180 acres - $6,700
Return on 1,380 acres grain $36,840
Total return $43,540

System one total return 40,050

Difference between the two systems is $3,490 or $2.32 per acre.

This small difference can often be made up by changing management technique, so obviously a different system is needed.

System three - mixed system

The grain operation is carried out over the entire farm with no reduction in acreage for feed. The roughage comes from the grain operation, without robbing the farm of grain acres. The net effect is added profits from cattle.

Whether you feed chaff or hay, costs are different.

Expenses per cow on an 80-cow herd:

	Chaff	Hay
interest (cows and replacements)	102	102
equipment and fuel (10 years)	43	86
pasture and breeding	68	68
barley and minerals	50	23
bedding and twine	10	13
vet and miscellaneous	10	10
seed, fertilizer & seeding	-	18
Total cost per cow	283	320

The difference is accented by a reduction in profit from the grain area when hay is used.

Chaff - Hay Comparison

	Chaff		Hay
Income - 76 calves @$425	$32,300		$32,300
Expenses - 80 cows @$283	22,640	@320	25,600
Net return from cattle	$ 9,600		$ 6,700
Reduced returns from grain	-		-3,210
Net Profit Increase	$ 9,960		$ 3,490

Chaff has other advantages. It takes only four or five days in the off-season to put up chaff compared to 15 days for hay. It can be done with one man compared to two, the weather has a negligible effect and it only has to be handled once.

The advantages to a grain operation is, it leaves the straw on the field to increase soil fertility, removes the heavy chaff layer which retards germination the following spring if left on; it removes weed seeds which pass through the combine and it removes grain seed which causes volunteer growth. The only disadvantage is the feed has to be supplemented.

Chaff can be collected from just about every crop, although rapeseed or canola is a questionable source.

Chaff yields from cereal grain crops vary greatly, but you usually get feed for 70 to 110 cows from 1,000 seeded acres.

If you ammoniate the chaff you increase its feed value and the palatability. Tests indicate with minerals, salt and vitamins added, treated chaff provides a complete maintenance ration for beef cows.

Chaff	Crude Protein	Total Digestible Nutrients
Untreated	4.75 - 6.5%	40 - 45%
Ammoniated	11 - 14%	45 - 50%

To ammoniate all you need is chaff with a moisture content of 15 to 20 per cent, three weeks of temperatures above freezing, a reasonable quality of chaff, a plastic cover and ammonia. Cost for a 45 ton stack including the plastic and fish net to hold the stack in place is $805.75 or $17.88 per ton.

Cattle clean it up much better than hay. They tend to pull long hay out, walk on it and not eat it. They eat it like silage.

Questions

In poorer areas where chaff is used, will it reduce soil tilth?

Most farmers don't feel it is a problem. We aren't taking high tonnages off. It is more than offset by the improvement in germination without the chaff there to retard it. As well, as much nitrogen is used breaking down chaff as leaving the chaff there puts back into the soil.

Sometimes our crop is really short and we have as much chaff as straw. What do you suggest?

A chaff feeding system doesn't suit all operations. However, if the grain crop is that short, you would probably be better using chaff. It is a good drought relief program because chaff doesn't vary between a good and a bad crop.

Did you have a compacting problem?

Over the four or five years I've been doing this I had one or two problems. I was testing to see if chaff would work, so I didn't feed any grain regardless of temperatures. Now that I have proved it works, I would add a little grain in cold weather.

to ask, "Are we breeding the bull out of our bulls?". Too many times we have seen our new bulls of the modern type fail their fertility examination. Too often length and height seem to correlate with short readings on scrotal tape.

I think we have to remember too, that in Saskatchewan we are dealing with an extreme climate and I seriously doubt that extreme climate and extreme cattle go well together. If we want so-called modern cattle, we had better be prepared to provide a lot more than the north star for shelter, and snowballs and promises for feed.

Another area Lands Branch will be re-evaluating is what age to buy bulls at. Purchasing yearling bulls is nothing new to some producers and makes good sense from many angles. The breeder is spared the costs of fitting his animals for two-year-old shows and sales and the buyer should be getting an animal that has not been harmed by over-feeding. Also, at the long yearling stage, you should be able to evaluate a bull's potential but not be fooled by excess weight. Too many two-year-old bulls are dissappointing once they get into their working clothes.

Another method of getting good bulls would be to have two-year-old sales for working bulls. However, until bull purchasers of all kinds can distinguish between size and quality and are willing to pay for that quality, I suspect breeders will remain reluctant to bring out bulls in working condition.

Lands Branch has been insisting on scrotal measurements on bulls offered at two-year-old sales. This will continue and likely the fertility standards will be broadened and raised. Besides this there will have to be more liaison between ourselves and breed associations and their sales committees. We are in the same business of producing beef and must work together.

LOW COST LOW LABOR SILAGE FEEDING TO THE COW HERD

Donald J. Robertson, producer and 1982 Nuffield Scholar, Carstairs, Alberta

Our aim is to produce the best quality feed possible at the lowest possible cost. Cow calf systems can only support the most economical harvesting, inexpensive storage and cost effective feeding systems.

Advantages of silage

You can put up large quantities of forage over longer periods at near the nutritional peak in a one step operation that leaves the fields clear for fall cultivation. The Ensiling process improves the palatability of hailed, weedy or frozen crops. The whole system is mechanized. The finished product is ready to eat. It needs no further processing. Cattle have very few digestive problems. Weather during harvest isn't a problem. You can make good silage on days when it's too wet for harvesting. Harvest weeds and all. Few if any will be viable after ensiling.

Silage contains more total digestible nutrients than harvesting grain, bailing the straw and saving the chaff.

Field harvesting losses are lower compared to dry harvesting, plus feedling losses are low. There's no carry overy problem. Well protected silage will last forever.

Disadvantages

You need several people to put up silage, and the machinery investment is high. You have to handle more weight and store carefully to reduce losses. You can't sell it as easily as forages.

The silage process

Silage is the same whether the process goes on in a pile on the gound or in the most expensive silo you can build. The only differences will be the water level, the type of mechanization you need, and the losses inherent in each kind of storage.

The process is a natural one, a pickeling process almost. Feed is preserved by the acid it produces under natural fermentation.

After swathing, chop the plant material and put in a silo. The plant continues to use oxygen trapped in the cells and between plant pieces. Once all the oxygen is used up the ensiling process begins. To help the process along, you chop the plant to reduce air spaces, help packing and free the juices to start the ensiling process. Pack the stack to drive out as much of the air as possible. Fill the silo quickly and steadily to keep minimum, surface exposed to air. Reduce the surface area exposed to air as much as possible. cover what you do each day to prevent air getting back in.

Cover with black plastic. If it may be stored into a second season, cover with a heavier grade and cover with six inches of straw.

Equipment

You'll need a grain swather without conditioner along with an operator who can double as a part time packer. You'll also need a tractor and forage harvestor an operator and a high dump wagon. Blowing directly into trucks isn't recommended as it is hard to keep radiators clear, and you need an extra truck.

You need a truck or wagon to haul to the bunker. A grain truck converted will do well. One truck can keep up with a large forage harvestor on hauls under two kilometres, one way.

To put silage in the bunker you need a front end loader equipped with a roll guard, and a full time operator. And to pack silage, you'll need a narrow wheeled tractor with roll guard.

A wide range of forages make acceptable silage; sweet clover, rye, red clover, all hays and cereals.

Because timing isn't crucial, you can share equipment and labor among neighbours or use a custom operator, or even become a custom operator. You will likely have all the equipment except the forage harvester and the high dump wagon on your farm.

Buy or hire?

If you have less than 320 acres of forage, you can't justify owning the harvestor and wagon based on savings over custom operator charges for those machines. If you have less than 160 acres, the custom operator can do the whole job for you while you are on holidays and you will be dollars ahead, even after paying for your holiday.

Silage systems

What you want to do with the silage will determine total management of the crop. If silage is to be fed solely to cows, providing protein will not be a big problem and you will probably harvest the more mature crops for energy at the expense of protein. If the silage will be the major part of the growing ration of weaned calves as well as, harvesting early for best protein content. If you use silage to supplement lower quality feeds, the quality of the silage becomes much more important. Once you decide on quality you can decide about storage capacity and feeding systems.

Stack silage

It costs nothing, but that is the only advantage. It exposes large areas to air, and is hard to keep covered. Storage losses are high. It can also be dangerous to pack because the tractors can roll.

Contained pile - a pile with a couple of rows of "something" to contain the side flow of the material. We have put silage between parallel walls made by a stackliner, lined with plastic. They can be filled to the 7th or 8th bale if the sides of the pile are kept full and the crown added to the end. Plastic should protect the silage and the bale so both come out in good condition. When feeding begins the site is cleaned up entirely and may be moved next year.

Pit silos - If you are lucky enough to have good slope, 1:4 or 1:5, a bank with good access to both bottom and top, or a ridge that can be cut, and relatively stable soil that won't collapse, you can build a pit. Use some of the earth removed to build up the area where the cut wall is low to give the floor some drainage. And you have a silo that will last a good many years. If the sides are unstable over time, improve them with tilt-up walls or use one of the spray concrete products. If the floor is all right, don't concrete. Pits are easy to fill from either the bottom or the top. Fill completely to the top of the walls and crown, otherwise they will collect drifting snow and taking in run off water in spring.

Bunkers - these are simply an above ground pit, you can put them wherever you want. Strip ground to stable soil and shape to give drainage end to end. Build walls of treated planks fastened horizontally outward sloping and braced posts, or you can use tilt-up concrete walls. Walls should be six to eight inches thick and contained 8 x 8 inch steel mesh. Set them to tilt out at the top and support, using the soil you stripped from the site. A concrete floor is a luxury unless ground conditions will

not support equipment in spring. Never use asphalt.

Tower silos

These are hard to justify for beef cow herds.

Feeding

Self feeding - with an electric wire or moveable feeding gate takes a solid bottom, good drainage, careful management. As well, the silo face is likely too narrow.

On ground - the cheapest and fastest way to feed cows a total silage ration is to spread it scoop by scoop on the ground right next to your silage pit. The major problem is that manure builds up. Feeding on frozen ground with or without snow is satisfactory for mixed silage based rations. Silage will carry any mixed minerals and grain with little loss. This is the most common method of feeding for most of the winter. You can find shelter areas where cows can eat in comfort.

Open bottom bunks - These are built out of rough 2 inch lumber 18 inches deep and 30 inches across with cross bars about three feet above the ground so cows won't walk through the bunk. Place where needed, and use as a single unit or put end to end. When it gets muddy around the bunks, move them. Try any variation of this - old water tanks, used tractor tires. The advantage is these are easy to fill with bunk feeding equipment.

Permanent bunks - The simplest form of this is where the silo is next to the feeding area and you can use the front end loader to move feed. Distance is a limiting factor, and you can't mix feed. A variation is a series of 10 foot square, three sided boxes with the open side facing the silage storage and open corners connected by fence to make a continuous barrier. Build a cone of hay or straw bales in the middle and dump silage over the cone to distribute to the three feeding sides.

Feeding equipment

The best for volume and versatility is the truck mounted auger mixer box. These will handle anything from straight silage to straight grain and blends of everything. Any cow calf operation with a feedlot enterprise can justify the truck mount. Next best is a trailer mount auger mixer box. The only difference between the two is the trailer mounted unit is slower to move around.

Other equipment include slat chain/ beater/side delivery wagons.

Questions:

1. A salesman wants to sell me silage in a bag. What do you think of these systems?

I have never used them. The discouraging factor is that the bag cost $500. It costs another $500 to rent the machine to put them up. So it costs $1000 to put up 150 tons, making it an expensive system. Spoilage is controlled by the operator. Preventing spoilage is the major purpose of the bag systems, but if you follow all the approved practices, spoilage isn't a problem. The major advantage of the system is that you can put up small amounts at a time, and add to the bag.

2. Which feed is better used by animals, silage or barley?

Barley. Silage is good for growing, barley is for finishing.

3. What about feed efficiency?

(Dr. Christensen reponded) The feed efficiency of barley is higher than silage.

ROUND BALES, ELECTRIC WIRE FEEDING

Doug Wotherspoon, producer, Melville

I have been using the electric wire forage feeding system since 1974, first with a 1200 McKee Stack-N-Mover, then with large round bales. I found it took very little to adapt from the loose stack feeding system to large round bales. I move the bales into the feedlot in late fall, remove the twines and place bales in rows with the two ends closed. I use two 110 volt solid state CSA approved chargers which cost just under $100. Upkeep has been minimal.

I also bought about 360 feet of posi-shock cable for a cost of $640. This cable is effective if properly grounded. It provides excellent feed protection and stands up well with care. It must be kept electrically charged during the feeding season. Check it regularly for damage. String it loosely, particularly in cold weather.

After nine years of use, the original wire is still in good condition. A single strand of ordinary soft telephone wire or barbed wire offered good protection in 1981 and 1982 which were milder winters.

I installed single live wire around a six to eight acre exercise and feeding area with about 600 feet of feeding space. I use the two chargers to power this wire. These must be well grounded. During extremely cold weather, the chargers can become sluggish or they can stop operating altogether if they are not protected. I have installed one unit in a quonset which protects it well even in the most severe weather. The second is outside in a small, insultated plywood box. On cold evenings, I plug in a 40 watt bulb which keeps the box warm enough. The winter feeding area is protected so there is no snow drifting over bales. I don't think this type of feeding system would work well in an open, wind swept feedlot. My winter feeding area is good, but it is too low with poor drainage for spring.

Each fall I set up an early spring feed supply in a well sheltered, sandy area. It is well away from a power supply, so I use a 12 volt electronic fencer. When the ground is damp, these 12 volt electronic fencers supply a good shock, and do not short out. I rotate the two 12 volt batteries and recharge them. With this system I use a six or eight foot grounding rod driven down into the moist soil. This kind of fence needs better grounding because of its higher output of current. I bought the unit in 1979 for $95 and have had no upkeep expenses. It provides good spring feed protection, and an effective source of power for dividing up temporary pastures with single wire in summer.

This winter I am feeding about 170 head of cattle with little labor and power. I have three different groups. The cow herd, market cattle and spring calves. The cow herd has free access to 1982 and 1983 oats and barley straw and controlled feeding from sweet clover bales two or three hours a day.

The market cattle have 24 hour access to alfalfa and wild hay and controlled feeding from the same sweet clover bales the cow herd feeds from. I prefer feeding clover from a loose stack compared to round bales. I never had any problem with moldy feed or sweet clover poisoning. Round bales of sweet clover retain quality if they are carried over from year to year.

Spring calves feed from alfalfa, wild hay and green feed bales. I think

it's practical to have an alternative feed mix and I have been adding wild hay and green feed large bales to each row. It seems to reduce possible bloat problems.

Weaned calves are shy of the wire so you have to be careful when starting them on the system or they may starve. Set bales in solid rows and the charged wire at least eight inches above the ground and close enough to the bales so the wire won't short. This prevents the calves from stepping over. As they eat back above the wire, I raise it so they can eat under it without touching it. During the extremely cold weather, cattle seemed to lose their respect for the single wire. I added a second wire below the live wire. Plastic pipe cut into seven inch sections acted as insultated dividers. Six foot rods placed in the bales 12 to 14 feet apart hold the wire up. The wire is hung from the rods with nylon twine. I ground the second wire to a cable extending along the end of the feeding areas and grounded to the six foot rods. This ground wire makes the fence effective under severe weather conditions. This system compares favorably in performance with the posi-shock cable and at a fraction of the cost.

Advantages

Cattle move to the feed, and little power and labor are needed once the bales are in place. Snow and manure don't build up because cattle move into the feed. It's initial and operating costs are low. You can feed a daily controlled mixture of forage types. The electric charger can be used year round. It trains livestock to respect fences. Forage waste is kept to a bare minimum.

Disadvantages

Regular twice daily checks are necessary. Some types of feed pack tightly and young calves especially, may need help loosening feed. It takes a lot of room to store winter feed supply if you have a large herd. You need a well sheltered area to prevent snow drifting over and around bales.

MINERAL NUTRITION OF THE COW HERD

David A. Christensen, Department of Animal and Poultry Science
University of Saskatchewan

In feeding the beef cow herd, the highest cost portions of the ration are the energy and protein sources. However, the mineral content of these feeds and the adequacy of supplementation can have a dramatic effect on the performance of the cows and their calves. In this presentation, only some of the more critical mineral elements in Saskatchewan feeding conditions will be dealt with. These include calcium, phosphorus, copper, sulphate, zinc, manganese, iodine and selenium. Other minerals such as cobalt, magnesium, molybdenum, sulphur and potassium may also be of interest under some circumstances.

In managing a mineral feeding program for a beef cow herd, it is useful to know the mineral content of the feeds or at least the usual characteristics of feeds grown in a certain area. It is also necessary to consider and identify factors in a particular herd that may affect their requirements. Also, there may be certain conditions within the herd or feeds that influence mineral availability and must be taken into account in formulating a mineral feeding program.

On the basis of the above information, an appropriate supplement can be selected. One of the more difficult aspects of managing the mineral supplementation program is selecting and developing a working method of feeding the supplements in appropriate amounts.

In various parts of the world, the [illegible] of mineral supplements, often calcium and phosphorus sources containing variable amounts of trace minerals, have had dramatic effects on calving percentage. In one study in Brazil, the use of a calcium-phosphorus source increased calving percentage from 55 to 77 per cent. In a Peruvian study, the use of a calcium-phosphorus-copper supplement improved calving percentage from 25 to 75 per cent. And in a Saskatchewan study at Cumberland House, the use of a calcium-phosphorus supplement along with improved energy intake, improved the calving percentage from 64 to 90 per cent.

A complicating factor in selecting mineral supplements is the very large variation that can occur between animals of the same breed and also the general differences that may exist between breeds. This means that when animals are introduced into a new area, there may have to be some vigorous selection of animals that can adapt and perform at a satisfactory level while making use of the mineral levels that are available in the local feedstuffs. For example, it has been observed that availability of phosphorus between animals of the same breed may range from 40 to 80 per cent and, in the case of copper, the availability may range from 2 to 10 per cent.

A phosphorus deficiency is one of the most common nutritional problems affecting fertility and performance of the beef cow herd. It can result in general conditions of unthriftiness, lethargy, reduced feed intake and slower growth. It can also result in lower milk production and with consequent effects on calf performance. It may also result in impaired reproduction, bone abnormalities and, in severe deficiencies, depraved appetite. A phosphorus deficiency can be identified by evaluation of the feeds and estimation of phosphorus intake. In some cases, analysis for fecal phosphorus or analysis of plasma for inorganic phosphorus content may be warranted.

The phosphorus requirements of cattle used in western Canadian ration formulations are those provided by the United States National Research Council. They are somewhat different from the corresponding Dairy Requirement Standard and from various European estimates of requirements (Tables 1, 2, 3). They appear to be the most suitable reference values for beef cattle in western Canada. However, it has been observed that an allowance of 10 to 20 per cent over the NRC requirements for early and late pregnancy may be required. The U.S. - NRC values for milk production appear to be adequate for both milk production and breeding.

In evaluating phosphorus intake by cattle, it is useful to calculate the actual phosphorus intake rather than dealing only with the phosphorus intake as a percentage of the ration. This situation arises because of the variable nature of dry matter intake by beef cattle depending on their physical condition and the energy density in the ration. It may be that cows that are in good condition and losing weight may be mobilizing sufficient bone mineral and phosphorus from other tissues to reduce their dietary requirement.

The calcium:phosphorus ratio should also be monitored. If the phosphorus intake exceeds that of calcium, bone abnormalities and other undesirable side effects may occur, while an excess of calcium intake increases trace mineral requirements and may also lead to bone defects and possibly to arthritis in bulls. The availability of calcium from various sources may influence the total dietary amount required. Most sources are somewhat less available than bone meal. Alfalfa hay, though very high in calcium content, may provide a lower proportion of available calcium. It has been suggested that this slightly lower availability of calcium in alfalfa hay (40%) may be related to the high oxalate content. The estimated calcium requirement allows for an average availability of about 50 per cent.

Mineral supplements are often provided free-choice and the appetite of the animal and other conditions influence the actual intake. For example, high soil fertility and consequent high mineral content of forages may result in lower voluntary mineral consumption by cattle. The forage type itself may influence mineral intake, and it has been observed that lower mineral intakes may occur when legume forages are fed. It has also been reported that voluntary mineral intake is lower when cattle are on improved pastures compared to native range land.

Season of the year may be an influence in that voluntary mineral consumption is often lowest when the pasture is actively growing. The mineral content of drinking water (sulfates and chlorides) may reduce mineral supplement intake. Cattle that are rapidly growing, pregnant or lactating may have higher mineral consumption. The kind of supplement provided may have an influence on intake as will the management of the mineral boxes. If the mineral is allowed to become wet, moldy or soiled with manure, then intake will be lower. The placement of the mineral source in relation to water and feed supplies can have a bearing on consumption.

There are also individual animal differences in appetite for mineral as well as differences between strains and breeds. Some of this variation among animals may be associated with learned mineral appetite that is based on early experiences of the individual cattle. There may also be flavor, odor or

supplement that influences intake. Appetite for minerals based on physiological needs of the animal may occur but are thought to be limited chiefly to phosphorus and salt. The success of using free-choice fed mineral supplementation depends largely on these foregoing factors.

Sometimes ingredients may be mixed with the mineral supplements to improve palatability. These ingredients may include dried molasses, soybean or cottonseed meal, dried yeast cultures, fat or salt. Commercial supplements may also contain a variety of flavor agents such as fenugreek, licorice or anise. Top dressing of minerals by sprinkling them on a grain mixture or on silage is one alternative to free-choice supplementation. Minerals may also be force fed by mixing of the mineral with cereal grain or protein supplement. This method depends on the feasibility or necessity to provide energy or protein supplements and is not always suitable.

A cafeteria method may also be used to supply minerals. This system allows the animals to have free-choice access to as many as ten minerals that are fed in individual feeders. It makes the assumptions that cattle have nutritional wisdom and will select the mineral supplements that they require in appropriate amounts. Research has shown that this assumption is not warranted and the intake depends to a great extent on the nature of the carrier used for the various mineral sources. It has also been shown that this method of supplementation may be more expensive than is warranted.

Trace mineral supplementation for cattle provides a number of additional considerations. It is essential to devise a system for providing appropriate amount of these trace minerals and also to avoid feeding excessive levels. In assessing and developing a supplementation program, the actual amount of mineral consumed per day should be considered as well as the concentration of the trace mineral in feedstuffs and in supplements (Tables 4 & 5). For example, 500 kg beef cows may require 440 mg per day of zinc and of manganese, 110 mg per day of copper, 5.5 mg per day of iodine and 1.1 mg per day of selenium. The maximum suggested level for zine and manganese intake is about 5,500 mg per day; copper 880 mg; iodine 275 mg; and for selenium 55 mg per day (Table 6). There is no doubt about the actual safe levels of these trace minerals and some caution should be used in order to avoid over-supplementation.

A special situation exists in Saskatchewan with regard to copper nutritional status. The high content of sulfate in some well waters (over 1,500 ppm) and moderate to high levels of molybdenum in forages (2-12 mg/kg) can reduce the availability of copper to very low levels. Under good conditions, about four per cent of the dietary and supplementary copper may be absorbed by the animal. Where sulfate or sulfate and molybdenum intake is high, this intake may be reduced to one per cent or less and in some Saskatchewan conditions, it may be almost impossible to achieve absorption and retention of copper (Figure 1).

Research is being conducted on the effectiveness of injectable copper and treatment of water in improving copper status. Removal of sulfate from water is expensive and at the present time, not a feasible method of dealing with severe copper deficiencies. There is, however, some evidence from the University of Saskatchewan Termuende Farm at Lanigan suggesting that removal of sulfate will improve liver copper content and may result in improved cow weights and utilization of feed.

Large differences have also been observed between breeds in plasma copper levels. Plasma copper is not always indicative of nutritional status but there is some supporting evidence for differences between breeds and also within breeds in copper requirement (Tables 8 & 9). A slaughter study carried out at the University of Saskatchewan in the summer of 1983 (Gooneratne and others) indicated that 60 to 73 per cent of the cows slaughtered in Saskatoon had lower than desirable liver copper levels (Table 10). Steers, on the other hand, appeared to be in better copper status and only 18 per cent had livers containing less than 25 mg/kg of liver dry matter. On the other hand, zinc status appeared to be much better with only eight to 17 per cent of the cattle slaughtered in Saskatchewan containing less than 100 mg of zinc per kg of liver dry matter (Table 11).

A wide variety of mineral supplements are available in western Canada (Table 12). Some, but not all, contain adequate levels of trace minerals. The calcium and phosphorus levels in rations should be selected based on the amount and kind of forage and grain in the ration. Depending on local conditions, it may also be desirable to provide a source of zinc, manganese, copper, iodine, cobalt and selenium.

In some cases, a calcium-phosphorus source fortified with trace minerals may be most suitable. However, in many situations, calcium and phosphorus supplementation is not necessary and a trace mineralized salt may be the most workable method of supplementation.

The optimum concentration of trace minerals in the supplement will vary depending on the desired or necessary intake rate. It is however, unusual for the rate of supplementation to be more than 60 gms (2 oz) per day for extended periods of time. When a mineral supplement is provided at that rate, then it may be desirable to use a supplement containing approximately 0.3 per cent copper, 0.5 per cent zinc and 0.4 per cent manganese. The iodine content should be about 0.02 per cent and the selenium where it is required, can be provided at 8 to 25 mg/kg of supplement (Tables 12, 13, 14). Depending on the mineral content of the major feedstuffs, slightly higher or lower concentrations of trace minerals may also be warranted.

The current cost of mineral ingredients range from about $0.30/kg for calcium to $2.40/kg for phosphorus. The inclusion of trace minerals in a salt or calcium-phosphorus supplement usually adds $0.10 to $0.25/kg. Where mineral supplements providing salt, calcium, phosphorus and trace minerals are provided year round at a rate of one ounce per animal daily, the annual cost is approximately $6.50/year.

Where trace mineral or major mineral nutritional problems are suspected, a livestock producer is advised to have his feeds analyzed for a period of several years and also to work with a nutritionist, veterinarian or consultant in selecting or developing a mineral supplement formula that is suitable for his conditions and also in working out a method of supplementation that is both economical and effective.

Table 1. Phosphorus requirements of cattle

grams daily for 500 kg cows

	US-NRC Beef, 1976	US-NRC Dairy, 1978	UK-ARC 1980
Maintenance	13	15	12
Late Pregnancy	15	22	17
Maintenance + 10 kg Milk	43	32	28

Table 2. Energy requirements and feed intake by cows

500 kg cows

	Maintenance or Early Pregnancy	Late Pregnancy	Maintenance + 10 kg Milk
TDN, US-NRC, kg/day	3.9	4.5	6.7
Winter Est	5.0	6.0	8.2
Feed Intake, kg DM/day			
Minimum, Warm	7.5 (16.5 lb)	8.6 (19 lb)	12.2 (27 lb)
Maximum, Winter Est	9.6 (21 lb)	11.5 (25 lb)	15.5 (34 lb)

Table 3. Suggested acceptable phosphorus intakes

500 kg cows

	Maintenance or Early Pregnancy	Late Pregnancy	Maintenance + 10 kg Milk or Breeding
Requirement, g/day	13	17	40
Safe Allowance	15	20	44
Feed DM Intake, kg/day	7.5	8.6	12.2
%P Requirement in DM	0.2	0.23	0.36

Calcium intake should not be less than phosphorus intake.

Table 4. Trace mineral requirements, cows

mg/kg of feed dry matter

	US-NRC Beef, 1976	US-NRC Dairy, 1978	UK-ARC 1980
Zinc	20 - 30	40	30
Manganese	1 - 20	40	20
Copper	4	10	8 - 20
Iodine	0.05 - 0.1	0.5	0.5 - 2.0
Selenium	0.05 - 0.1	0.1	0.05

Table 5. Suggested acceptable trace mineral intakes

			Daily Intake Range if Daily DM Intake is 11 kg, mg/day	
	Minimum mg/kg	Maximum mg/kg	Minimum	Maximum
Zinc	40	500	440	5500
Manganese	40	500	440	5500
Copper	10 (20)	80	110	880
Iodine	0.5	25	5.5	275
Selenium	0.1	5	1.1	55

Table 6. Toxic levels of trace minerals, cows

mg/kg of feed dry matter

	US-NRC Beef, 1976	US-NRC Dairy, 1978	UK-ARC 1980
Zinc	900	500	150 - 450
Manganese	150	1000	1000
Copper	115	80	?
Iodine	100	50	8 - 20
Selenium	5	5	5 - 40

Table 7. ROP bull station plasma copper levels

mg/l

Breed	Plasma Cu After 112 Days on Test	Plasma Cu After 28 Days of Supplementation*
Angus	.39b	.93b
Charolais	.44b	1.0a
Galloway	.29c	.70cd
Hereford	.41b	.97ab
Maine Anjou	.44b	.77c
Shorthorn	.57a	1.03a
Simmental	.27c	.61d

* 0.5% TM supp supplying 0.2% Cu, .72% Zn and .35% Mn

Table 8. ROP bull station average daily gains

kg/day

	ADG to 112 Days on Test	ADG from 112-140 Days (+ TM)
Angus	1.39c	1.34c
Charolais	1.61a	1.45bc
Galloway	1.19d	1.32bcd
Hereford	1.34c	1.23d
Maine Anjou	1.55ab	1.50b
Shorthorn	1.40c	1.31cd
Simmental	1.51b	1.76a

Table 9. Termuende Farm study on water treatment (fall, 1983)

average daily gain of pregnant cows, Nov. 17, Jan. 4

Water	Copper Supplement	Average Daily Gain, kg	
Untreated	None	0.46	0.52
	Injected	0.44	
	Ad Lib Supp	0.67	
Aerated	None	0.56	0.54
	Injected	0.42	
	Ad Lib Supp	0.65	
Reverse Osmosis	None	0.48	0.61
	Injected	0.58	
	Ad Lib Supp	0.77	

Table 10. Copper status of Saskatchewan cattle at slaughter

	Cows Pregnant	Cows Open	Heifers Open	Steers
n	126	22	29	51
Liver Copper, mg/kg DM	28	16	41	73
SD	30	20	43	59
% Less Than 25 mg/kg	60	73	52	18

Gooneratne, unpublished

Table 11. Zinc status of Saskatchewan Cattle at Slaughter

	Cows Pregnant	Cows Open	Heifers Open	Steers
n	126	22	29	51
Liver Zinc, mg/kg DM	145	150	117	127
SD	56	50	28	27
% Less Than 100 mg/kg	13	14	17	8

Gooneratne, unpublished

Table 12. Mineral sources currently available

	Salt with TM	Low Calcium	2:1	1:1	1:1
Calcium, %	0	2	19	14	13
Phosphorus, %	0	19	9	14	13
Salt, %	95	25	25	14	12
Zinc, %	0.5	0.72	0.15	0.36	0.72
Manganese, %	0.8	0.48	0.24	0.24	0.48
Copper, %	0.3	0.25	0.1	0.05	0.25
Iodine, %	0.04	0.025	0.01	0.008	0.016
Selenium, mg/kg	25	8	-	8	8

Table 13. Mineral intakes from typical 1:1 (Ca:P) supplement

	Minimum Daily Intake (Pregnancy)	Composition of Supp	Intake From 60 g (2 oz)	% of Req in 60 g
Calcium	30 g	13%	8 g	27
Phosphorus	20 g	13%	8 g	40
Zinc	440 mg	0.72%	432 mg	98
Manganese	440 mg	0.48%	288 mg	65
Copper	110 mg	0.25%	150 mg	136
Iodine	5.5 mg	0.016%	9.6 mg	175
Selenium	1.1 mg	8 mg/kg	0.5 mg	45

Table 14. Mineral intake from a trace mineralized salt

	Min Daily Intake Preg (mg)	Composition of Supp	Intake from 60 g (mg/day)	% of Req in 60 g
Zinc	440	0.5%	300	68
Manganese	440	0.8%	480	109
Copper	110	0.3%	180	164
Iodine	5.5	0.04%	24	436
Selenium	1.1	25 mg/kg	1.5	136

MY APPROACH TO SELECTING AND RAISING REPLACEMENT HEIFERS

Ted Perrin, beef cattle producer

The following works for our operation, in our environment. If in the future, we think a change is necessary, we will change accordingly. Our system may not work for another operation. You must know your facilities and environment and proceed from there. Set your goal for what you hope to achieve in 10 years and aim for that. Consider your goal when selecting heifers.

We keep four things in mind when picking our replacement heifers: growth, balance or conformation, easy fleshing and femininity, in that order. For milk production be believe that if a cow is a good heifer, her mother was probably a good milker.

What goes into the calf is strictly hereditary since we don't creep feed. We use breeds and crosses that are somewhere between high milk production and easy fleshing. We keep the easy fleshing in mind when we consider speed of growth.

Calving starts in mid-April, so most calves are born in May. We wean around mid-October, or soon after when our calves are about five months old. We find it easier to feed calves than to give cows extra feed. As well, cows are in better condition to face a tough winter.

Last fall our commercial calves averaged 487 pounds and in 1982 they averaged 485 pounds. In 1972 our goal was to have steer calves weaning at 450 pounds in October and which would gain three pounds per day for 215 days on a growing, then a finishing ration. They weighed about 1,100 pounds by the end of June. Our steer calves at weaning this year weighed over 500 pounds, and they will continue to have good gain. We reached our goal because of Charolais cattle and A.I. This summer will mark 18 years since we began an A.I. program and began crossbreeding with Charolais, Limousin and shortly after, Red Angus. You may wonder what steers and steer weights have to do with replacement heifers, but you should have a clear picture in mind of what you want a heifer to do when you are selecting her. We feed our calves going back on grass one pound of grain and two pounds of hay per 100 pounds of body weight, more in colder weather. The rest of their feed consists of grazing and straw. We strive for approximately one pound of gain per day. If we are going to breed this heifer, this would not be enough. We don't breed our heifers until they are two years old which probably puts us into a group of producers that is less than 10 per cent of the total. We put our heifers back on grass in April.

These are the average weights of our open heifers in mid-September for the past four years: September 23, 1980, 57 heifers, 906 pounds; September 15, 1981, 51 heifers, 878 pounds; September 13, 1982, 89 heifers, 921 pounds; and September 12, 1983, 99 heifers, 950 pounds.

We winter our open yearlings with the cow herd. This keeps them in about the right condition so they are being flushed in June just before breeding. Our breeding season is from July 5th to September 15th. We breed our heifers to Red Angus bulls at two years of age. When they calve at three, the pelvic opening is 7/8 the mature size. We have always agreed with Dr. Cates who told us that the pelvic opening is 3/4 mature size at the age of two, 7/8 at three and full size at four.

They have their first Charolais calves at four when the pelvic opening is full size. Heifers calve in the pasture with the cows and have no more trouble calving than the cows. The disadvantage of breeding two year olds instead of yearlings, is that we miss one calf that year.

The advantages are that we feed less for three winters than when we have bred yearlings. We experimented with this 10 years ago using 40 heifers and four years ago using 20 heifers. We have a small percentage of assists at calving (the heifers are in the same pasture as the cows and are checked the same number of times. Any needing help will be culled and shipped in fall). Calving in the pasture avoids scour problems which calves from heifers are prone to. As well, heifers can be flushed. I have had 80 per cent come in heat in 14 days, a response which I have not had from yearlings. This only happened once, but it can happen, and we have a good response every year. No one so far has been able to tell me how to flush a yearling, and I don't think you should try.

The disadvantge of breeding at two is that we miss a calf. However, we try to get one at the other end of the cow's life for the one we missed at the start. We have 15 or 20 cows calving at 14 or 15 years of age this year. The replacement heifers from cows over 10 are the most valuable because older cows have to be good producers to be around that long, and their heifers should inherit some of these traits. Our cows are culled the first time they are dry.

We believe in the Lasater Theory, which is cull as nature would. We don't believe in milking cows, trimming feet or pulling calves, so we cull accordingly.

Other comments

Perrin also says they have experimented with about half of everything. They maintain their own breeding herd and produce their own bulls and have done for 15 years. Brown Swiss take too much feed in winter. They feed their herd lentil screenings during cold weather.

A CATALOGUE OF SIGNIFICANT REPRODUCTIVE PROBLEMS AND THEIR SOLUTIONS

Dr. Bill Cates, Western College of Veterinary Medicine

In reporductive efficiency there are three places to give credit or lay blame: the bull, the cow and man. The most important one is man or management. Management controls what happens to the cow and bull factors.

One of the factors affecting the calf crop is the percentage of cows getting pregnant and the number of cows staying pregnant. Failure to get cows pregnant is the biggest loss area - almost 20% of the reduction in calf crop. The biggest problem is the way cows are revved up for the breeding season - the management of cows and heifers. Nutrition - that's where most people lose it. You can't breed until the cow cycles and then they have to conceive at a high rate.

There are some bull problems but in contrast with the cow's, most of the bulls problems are inherited. There is no point having all cows cycling if the bull can't get them pregnant. Not all bulls are created equal. There's a wide variation ranging from 2 per cent sterile to 2 per cent super bull and the rest in the middle.

The test of reproductive efficiency is how fast your cows get pregnant.

We have to look at conception rate in terms of breeding season. Producers decide to have a breeding season of a certain length, and don't realize what that means to the conception rate.

If you want a high rate and short season, the first thing you need are cows that are cycling at a high rate. Cows must be cycling the day the bulls are turned out. And they have to conceive at a very good rate, 70 to 75 per cent on the first service if you want a 40 to 45 day calving season. Once you set a goal, you lock yourself into a high conception rate.

If we have a theoretical 100 cow herd, and they are all cycling we ought to have 75 cows pregnant in 21 days. Twenty five cows have to come back. If we assume 75 per cent will conceive, which is 19, the total is 94 per cent pregnant after the second service.

If you drop to 60 per cent conception rate, you have to have a 63 day breeding season. You have to go through the cycle three times. (Table 1)

The data in Table 2 is from herefords on normal rations and shows the percentage of cows cycling at different numbers of days after calving.

You have to get out to 80 or 90 days post calving before cows cycle. Heifers were behind cows all along, which is why you breed heifers before cows so they have the calves ahead of the cows so when they come into the herd, they come in at the right place and don't fall behind. Fifteen months is the ideal.

Heifers need that extra time to rest before they get in with the rest of the herd.

Carry your cows through winter so they don't lose weight. Remember the weight they seem to be gaining is calf, fluid and membranes. Otherwise, you are causing yourself trouble in breeding pasture. The cow has to gain the weight of the calf and maintain her condition. This kind of cow has a little over 50 days before she can begin to cycle again after birth. If she loses weight, before calving, it will mean another 30 days before she cycles. (Table 3)

If we feed half the rate she should be receiving for four months before calving and continue after calving, only 17 per cent are in heat after 60 days and 22 in 90 days. And you have a conception rate of 33 per cent.

This trial took place about 20 years ago. The figures looked good then. Now we know with extra care and extra energy we can improve these first service conception figures to 70 to 75 per cent pretty easily.

There are two critical times for cows to calve, cycle and conceive: the winter and calving to conception. Always have a spring pasture and a fall pasture. Native grass won't do it for you. Do not turn cattle onto native range too soon. There is such a thing as a spring grass, crested wheat for example. I think it would be a real boom to cattle producers to be able to have a true spring pasture and that's where the breeding cows should be in May is on a spring pasture or supplemental feeding. If you are relying on native pastures, you are locked into July breeding because that's when the energy is really there.

Heifers

There is no virtue in over or under feeding heifers. The critical time is 15 months. At 15 months of age they should weigh around 650 pounds for a Hereford type of animal. Larger animals should be about 100 pounds heavier than Herefords. Heifers must gain one to one and a quarter pounds a day from weaning to breeding at a steady pace. Over feeding later to catch-up results in fat. For Hereford type animals, if they gain 41 per cent will be in heat at 15 months. If they gain one pound a day, 77 per cent are in heat at 15 months.

Angus are different. If Angus gain half a pound a day, 77 per cent, were in heat at 15 months. At a pound a day 92 per cent were in heat. The Angus come to sexual function a little sooner than Hereford which explains the difference. Cross Hereford/Angus, at a gain of half a pound a day 91 per cent cycling at 15 months, at a pound a day, 97 per cent cycling.

Let's look at the bull situation

There is no sense having cows that could settle at 70 per cent if your bull can only settle 40 per cent. Bull evaluation isn't just a semen test. A bull must have sex drive, mating ability and good semen production at least.

A Colorado study, wanted to find out if you need to stick with a 1/25 bull to cow ratio. They picked the best bulls (didn't cull the bottom). They found 1/25, 1/44 and 1/60 bulls could detect estrus, and bulls are estrus detectors first, and breeders second.

All bulls are different. Even bulls that pass all the evaluations are different. If you're aiming for the moon, the average bull won't do you any good. Look at bull evaluations to help you pick off the top, not knock off the bottom.

Beef and dairy bulls are different - generally dairy are better. Beef cattle have lower sperm cell production, lower post freeze motility, higher number of abnormal cells, reach puberty one to three months later, and the libido is usually lower, than dairy bulls.

Research done in the 1920s evaluated 237 bulls and found that 11.3% had poor semen, 10.6% had physical defects that would interfere somewhat with breeding capacity. And they describe a bull evaluation system that is better than the one we use routinely today. We still haven't learned how to look at bulls.

This emphasises that you can't just buy any old bull and get good conception rates.

In 1963, Colorado tested 10,944 bulls. In this enormous population, about 80 per cent were satisfactory, 10 per cent questionable, 10 per cent unsatisfactory. In the bottom 10 per cent, probably about two per cent were sterile. Some in the bottom group can settle cows, most of the middle group can settle cows, but hopefully these into top group can do it better. This evaluation system got abused; it cannot be translated into breeding percentages. But what it means is that one out of every five bulls of the run of the mill bulls isn't good enough to be out there.

Australians found they could increase pregnancy by rate by culling poor bulls. They raised the pregnancy rate to 85 per cent from 70 per cent just by culling 25 per cent of the bulls without adding any new bulls. It's better to get the questionable bulls out of the pasture because a cow in heat looks for a bull and if she finds a good bull she has a better chance of settling.

The Australians have given us a new way of looking at bull evaluation. They use a serving capacity test, that measures sex drive and mating ability combined. (Table 4)

You put a bull in with females for 40 minutes and every time the bull breeds that's his score. Then put out with forty heifers for forty days to determine 1st service conception rates and pregnancy rates.

In Colorado they tried another way of doing this test. They took high and medium bulls and put them in with heifers and they found they had conception rates of 54% high rates and 16% for medium bulls in a 20 day period.

How many times can a bull breed? In a test of 437 bulls, some bulls bred 19 times in 40 minutes, some bred 0 times. Another thing the Australians taught us was that watching the bulls in action showed up a few physical things that a physical examination alone couldn't find. They reject 57% on physical and semen examination, and 43 per cent on serving capacity. Watching bulls in action can show what the arthritis does, etc.

Physical abnormalities have a lot to do with servicing capacity. 63 per cent of low serving group had poor feet and legs. Healed hematomas are all found in the low and medium serving capacity category.

If you look at the normal sperm, you'll find you want a bull with 75 to 80 per cent normal cells for a good conception rate.

Breeding soundess evaluations are not the perfect thing. We have to do a lot of work on them yet. We have to work to find a better way to get the ones off the top not to cull from the bottom.

Bovine Vibriosis

A form of venereal disease. It's a terrible tragedy when we have such a good effective vaccine that so few producers use it.

Bovine Vibriosis causes early embryonic death, a period of infertility of about three months to blow your breeding season right out the window. Recovery is spontaneous. It is carried over to the next season usually by a pregnant mature cow, which will then infect the bull. It's hard to diagnose. There's no treatment. But there is a vaccine which will prevent it. Everyone, especially if you use community pastures, should be vaccinating your herds.

Questions:

1. How do we select bulls when we can't get veterinarians and scientists to do tests?

The scrotal examination go out of hand. It was used as the entire examination The Breeding Selection Evaluation, scrotal measurement, semen testing and sex drive should be used together. It's still not the entire answer. And we can't answer yet. In the next years, we're going to have to come up with a better evaluation taking all these things into consideration. We're just starting to see that what we've been doing since 1959, we haven't been getting very far. We weren't consciously going for the best bulls, we were getting rid of the bad ones. There's no excuse for a bad two year old bull. His good attributes will all show well enough as a long yearling to keep him or ship him off.

2. Do you have any correlation of scrotal circumference and libido.

There is no correlation.

3. We went from two year old bulls to older bulls because it seemed the younger bull would breed a cow several times, where older bulls did it once and went on.

You can get as good servicing from yearling bulls as older bulls. Bulls two should be top notch.

4. What per cent of libido is physchological as opposed to physiological.

I would say it is physiological, if we say physchological, we are imposing human characteristics on cattle. Young bulls have to learn. Serving capacity over time should be the same. The best bull will breed 40 cows in 40 days.

5. What about pecking order in multiple sire breeding herds.

The older dominant bull gets most of the action.

Table 1:

Conception Rate and Breeding Season

Conception rate	Breeding season	Pregnancy rate
75	42	94
60	63	94
50	84	94
45	105	95
40	126	95

Table 2:

Percentage of Cows Cycling

Days post calving -	40	50	60	70	80	90	100
Cows	55	70	80	90	90	95	100
Heifers	17	30	40	65	80	80	90

Table 3:

Effective Energy Levels on Heat and Conception

Calving		% of cows in heat		First service
before	after	60 days	90 days	conception rate
low	low	17	22	33
low	NRC	45	85	65
NRC	low	81	86	42
NRC	NRC	80	95	67

Low refers to half NRC requirements.

Table 4:

Serving Capacity of Bulls

Services in 40 min.	First service conception rates	Pregnancy rates percentage
0 to 2	10 to 40	20 to 63
3 to 5	54 to 65	89 to 93
6 or more	65 to 75	89 to 100

BEEF HERD MANAGEMENT RECORDS AND COMPUTERS IN THE '80's

Dr. C.M. (Red) Williams, University of Saskatchewan

If you think I can tell you how to run your breeding programs with a computer or which computer to buy, forget it. I think we're dealing with a broader issue than that.

The computer industry is being driven by marketing and advertising, not need. You must separate these to define whether you really need a computer. If you don't have one, don't panic.

Why do we need computers? The harsh reality is we're in a world market place. We must produce better and cheaper whether the product is for the export or domestic market. The computer may help with this by streamlining processes.

You don't have to be a computer operator any more than you have to be a chemist to use herbicides. In most cases you can use a computer without even having to own one. You use a computer every time you have an accountant do your income tax statement or when you go to the bank. Most of the effect computers have on your farm will be built in so you won't have anything to do with the operation of a computer.

So you want a computer? The most important thing to consider is the cost. The cost to you of getting a computer is one-third for hardware, one-third for software and one-third for the time you spend learning to run it. Count on spending about $4,000 worth of your time learning to make the computer do what you want it to. Don't be cheap. You'll have to spend $2,000 to $6,000 or the computer is just a game. Get a computer with at least 64 K memory, and if you intend to do spread sheets, you'll need 132 or 148 K.

The stairway to purchase

Decide what you want to do on the computer: breeding records, calibrate spraying rates, writing letters, calculating feeding rates or accounting. Know exactly what you want. No one else can do this step for you.

Go to a dealer, a major one and see if you can get the software you need to do the job you want to do. A major dealer is better for servicing compatibility among computer systems and trading up.

Find someone with a computer who has an operation similar to yours and visit him.

Take the equipment on trial or use a system in the shop for an afternoon. Remember someone in your family must be willing to devote time to learning and setting up systems.

What kind of operation needs one

Cow calf operators/mixed farms - a computer is probably the lowest priority they have.

Feedlots - if the operation has 500 head or more, a computer can be vital. Some operators say it will pay for itself with the first load of cattle calculated through.

Purebred operations - a real opportunity to keep records here, all sorts of information you can collect. There's nothing there you wouldn't collect now. If you're not doing much with the information now, you're not likely to do it with a computer. A comupter doesn't do anything new, just does it faster. If you use ROP to the highest possible level, you can use a computer.

Large commercial ranchers - can use a computer efficiently to keep simple records of large volumes of animals.

Problems

Right now there's no software designed especially for Saskatchewan, or even Western Canada. There are lots of programs that look good, but on closer inspection, they are set up for Eastern Canada or the Southern United States.

Once I've got it, what all can I do with it?

1. farm accounting - using programs like Visicalc

2. feed control. But remember, to be worthwhile, you have to be able to respond to changes in feeding programs as your computer alerts you to the need to change, otherwise why bother.

4. information retrieval through programs like Agnet, Telidon.

NATIONAL RED MEAT STABILIZATION

Honourable Lorne Hepworth, Minister of Agriculture

The first question a farmer would ask about the National Red Meat Stabilization program is why would a provincial government take part in discussions regarding a national program when we have an excellent, well functioning provincial program.

Historically, agriculture falls into federal and provincial jurisdictions. Stabilization is a federal responsibility. During the late 70's and into the 80's provincial programs proliferated with emergency payouts and ad hoc programs, basically because there was no federal program. The net result: the richest treasury won.

A classical example is Quebec. Ten years ago, Quebec had 17 per cent of the national hog production. Now they have 34 to 35 per cent. As an overlapping factor, we are in a global recession. Some provinces have had their credit ratings down-graded. Today in Saskatchewan, we have a good plan. And our credit rating hasn't suffered. In fact it has improved. But what would happen if our neighbours came in with a richer program which would pull production to them.

The talks. A year or so ago, meetings were held in Regina. National groups made presentations indicating what they thought a national program should do. Last fall Manitoba, Saskatchewan, Ontario, Alberta and Canada's ministers of agriculture agreed on a technical proposal. This proposal is now in the producer consultation phase. The programs must be voluntary, so farmers must like it. If they don't like it they won't join. And if they don't join, why bother.

The form of payout is irrelevant. You pay out of a program what is paid in. The program must be sensitive and must not lead to overproduction.

I've met with the beef board, the pork producers and attended the sheep meeting. I've had formal replies from cattle feeders, and attended the Saskatchewan Livestock Association convention. The Pork Producers are holding regional meetings with the proposals an important part of their agenda.

Mr. Whelan has called a meeting for February 9. I won't be there because I feel the meeting is premature. These meetings should be meetings of department officials to draw the results of the consultative meetings together and come up with a new or modified proposal if necessary. I feel the federally called meeting would pre-empt meetings going on around the province.

Quite frankly I am committed to the livestock industry to to build on our strengths. Historically that has been the crop industry. It brings in $3 billion dollars a year. But the cattle and livestock industry is an area of great potential and we should build on it.

The turnout at this seminar is an indication of the state of the industry and the mood. You are the movers and the shakers. The first adopters of new technology. And we have tremendous potential for a national livestock production, with or without the Crow debate. We have all the basics. We've got the cows. We've got the calves. And we've got the feed grains. It makes no sense

to take the barley and ship it out, and to take the calves, 500,000 a year, and ship them out. It makes a lot more sense to put them together, slice them all up, put them in neat boxes and ship them out.

I would suggest that Saskatchewan and more importantly Saskatchewan farmers are going to be leaders, not followers. It's not a government or a government policy that will achieve this. The government will try and stay out of your way and let your drive and initiative take over and put you on an equal footing.

FUTURE OF INTERNATIONAL BEEF MARKETS

Jim Waters, Vice President, Public Affairs, Canada Safeway

Canada Safeway has had an export development department since May 1981. Its purpose is to promote the sale of Canadian products to markets outside Canada. We get involved in shipping, financing, documentation, ownership and marketing. We are a service department and handle all the particulars necessary. Costs are paid by the buyer. This service allows manufacturers and producers to enter the export market with a minimum of expense.

While we export products like cheese, jam and bakery products, we have found the largest market is for the red meats. We don't just sell at Safeway stores in other countries. All products are offered to anyone interested, although Safeway stores do offer an instant chain to expose Canadian food items at a good cost. So far we have exported about $35 million worth of Canadian food products, about 75 per cent which is red meats. We have featured Canadian Beef in Hawaii and in fact sold 700,000 pounds in a week-long promotion, doubling last year's sales in the same week-long promotion.

We have exported to the United States, the United Kingdom, Europe, Australia, Japan, Nigeria, Saudi Arabia, but the United States, the United Kingdom and Japan are the three areas we've been working at penetrating.

The United States is an important market. Because of the similarities between our two countries the U.S. is a compatible market. But marketing beef is more difficult than other products. Probably because of pricing, grading differential, quota, packer and producer resistance. Our goal is to sell a high quality product on an on-going basis, and this combats the resistance. It is a good idea to develop markets for Canadian carcasses. Buyers pay a five cent premium for Canadian beef. If we are to be successful, we must offer beef in a more attractive way too. The best way is to promote boxed beef or individual primal cuts that can be effectively promoted and compete on our quality, consistency and leanness and not just price.

We have sold Canadian beef in specific regions of the U.S. - the pacific northwest and Hawaii. We've had some success in the pacific northwest but there is some producer concern and resistance.

Hawaii is another area where the potential is promising. Most or all beef must be imported. We've put on two Taste of Canada promotions this year with beef as the major advertised product. We've had product information seminars with individual stores giving us an opportunity to show the gain or yield to Canadian beef and its consistency from one box to another. This is the first time many people in Hawaii had seen Canadian beef. We put together television commercials backed by radio and newspaper ads. We set up barbecues to show Canadian beef cooking and give the opportunity to taste it.

The product we ship is fresh chilled and air flown so it commands a higher price. Hawaii has been a frozen market until now, supplied from San Francisco with prices based on U.S. mainland prices plus freight. We must promote beef on its consistency and leanness. We made contact with a broker there to get

into other stores. Hawaii is a strong market with no backlash, no politics and no producer or packer resistance. The distributor selling our beef has started buying pork and we have shipped 800,000 pounds in the last six months. In addition, we have done cutting tests with A1,2, and 3 beef to give customers a chance to compare Canadian beef to the U.S. product.

The United Kingdom is the biggest success so far 1.7 million pounds of beef. Everything must be imported under the GATT high quality beef quota we share with the United States, because United Kingdom is part of the European Economic Community.

The U.K. has been a customer for offal, now they are moving to primal cuts. We've had shipping and marketing penetrating this market.

As well, the U.K. is a traditional market and it is difficult to break historical patterns. They have traditionally purchased from New Zealand, Australia and Argentina. Their highest priced product is Scottish beef, and our beef is more expensive. A big plus has been the beef shows which indicate we must develop a market around consistency, supply, quality and service. We are working with hotel chains and restaurants. Herrods is carrying our product now; we've priced our product competitively with Scottish beef to create a demand. We've planned a minimum of four beef promotions accompanied by comprehensive advertising and brand awareness program. This will help get other institutes and chains like Marks and Spencers carrying our product.

In Japan all beef must be imported. Regulations are confusing and difficult, and beef imports are controlled. Canada falls under grain fed quota which we share with the United States and other producers of grain fed animals. Canadian beef usually does not appeal to the Japanese because there is not enough marbling, so we've been shipping them A3 and A4 beef.

Our cutting process is different from theirs as well. We're bringing in a Japanese cutter to show us how to cut to their specifications. Our biggest competitor in this field is the United States, and we'll never overtake them. The common element of international markets is a commitment. Without commitment it's a waste of time to try and find and develop export markets. It's not easy setting up a market in a different culture.

We haven't really looked too intensely at the California market because we are a relatively new export department. We've had to pinpoint markets we thought had the most potential - Hawaii with its lack of livestock industry, pacific northwest because of its closeness with Canada. The political ramifications of shipping a lot of Canadian beef into some areas must be considered, because there is a signficant local beef industry there with considerable lobbying clout. Past quotas show the strength of their lobbying clout.

Our beef is second to none, but we must be able to market it effectively if we wish to be successful in foreign markets.

GETTING A COW IN CALF AND KEEPING HER THAT WAY

Dr. Jack Manns, Professor of Veterinary Physiological Sciences,
Western College of Veterinary Medicine

If you breed a cow on day 1, 285 days later she gives birth. You have eighty days to get her bred again to achieve the goal of a calf per cow per year. That 80 day period includes the time needed to get the cow back into condition and cycling and bred again. Since the cow normally doesn't begin to cycle for 50 days after calving, you only have 30 days to get her bred.

The length of the breeding season is important because it influences the number of cows cycling at the beginning of the next breeding season. If you have a long breeding season, say 100 days, the number of cows cycling at the beginning would be around 50 per cent. If you tried to use a breeding program like prostaglandin your results would be poor. If you had a short breeding season, a substantial portion of the herd would be cycling at the beginning of the season.

A number of influences come into play in regulating the duration of the interval between delivering a calf and onset of heat.

	Dairy Cows	Beef Cows	1st Calf Beef Heifers
days to first ovulation	19±2	47±2	57±3
range	9-36	19-80	31-87
days to conception	102±7	80	80

You're dealing with a term you can't really manipulate very much. If you've got a cow that's suckling a calf she's going to take that 50 days before she starts to cycle. And beef heifers that are feeding a calf and trying to grow are going to take that extra 10 days. That's why you breed a heifer a couple of weeks or so before the cow herd, so they will be cycling about the same as the rest of the beef herd the next year. Nutrition plays an important role when cycling begins, but even if cows are adequately fed there is still this interval.

On that very first ovulation, only about half the cows will be seen in heat and after that, a higher and higher proportion will be seen. This happens regardless of the method of heat detection you use.

Techniques for breeding cows

The normal elements of the estrus cycle are: heat - 12 and 24 hours, then from day four to day 20 of the cycle, the cow has a structure that is called the corpus luteum. It is the corpus luteum that prostaglandins affect. If a cow is not cycling and does not have a corpus luteum, prostaglandins will have no effect. If a cow is at that phase of her cycle when she does have a corpus luteum, prostaglandins will have an effect.

The theory is to inject prostaglands two times 11 to 12 days apart. At the second injection, all cows should have a corpus luteum. After several years of work and tests, it has become clear that it is not possible economically to use two injections. There have been modifications to the theory though, so we know some schemes that are practical where we have injected once.

If you have a group of animals, two out of three will have a corpus luteum. So if you inject these cows, only the top would respond because the others don't have a corpus luteum. This has lead to a method I would recommend for your consideration.

Take a group of animals, detect estrus for five days at the beginning of the breeding season and then breed those animals as they come into heat.

This gives you a feel for how many of your cows are cycling. You should see 20 to 25 per cent of your herd in heat in that period. If you see less than that, chances are you have a group of cows cycling poorly and you probably wouldn't want to go ahead with any kind of a controlled breeding program. If you get the 25 per cent cycling, you have a group of good cycling cows and it would pay to go ahead and inject cows on day six, detect heat and breed them as they come into heat.

Theoretically you could detect and breed 75 to 85 per cent of your herd in 10 days. This can be an effective management tool for breeding your herd within the early part of the breeding season.

Detection affects conception rate

Some methods of heat detection are more successful than others. For example, in 24 hour continuous observation, you will correctly identify 98 to 100 per cent of the cows in heat. This isn't practical. If you detect three times a day, you will correctly identify 81 to 90 per cent; two times a day, 80 to 90 per cent. But if for example, you observe only during routine dairy activity, you will identify only 56 per cent. Bulls with chin ball markers are 98 to 100 per cent.

The key is a good record keeping system, good tags on your cows and observations at times when you can expect animals to be exhibiting heat. There's no point to feed cows and watch to see if they are in heat because they won't show signs. Detect when they are not eating.

One recent technique is a rapidly drying, very thick paint which is put on the tail head of animals. As animals are ridden, the paint flakes off. It is a cheap and effective way of detecting heat.

Studies in growth regulation in animals

Scientists can isolate growth genes. If you can transplant that gene so it is present in higher than normal concentrations they will stimulate the pituitary glands and animals grow.

Application - over the next five to 10 years we can use bulls through A.I. which transmit excessive hormones resulting in faster growing offspring. We can already penetrate an egg after ovulation and take out cells.

If we inject growth hormone into the male pronucleus just at the point of fertilization, the growth hormones couple onto the end of the chromosomes and become part of the male group of chromosomes. Then the male and the female pronuclei join and fertilization is complete. Cells divide and reproduce treating the extended chromosomes as a normal one and duplicating it precisely.

The animal upon birth will grow rapidly. This will mean selection for growth will be less important because we can manipulate genetically.

Control gets to be difficult. What are the implications in purebred herds? How do we handle this? These are all questions to be dealt with. We should probably do what we're doing now and select for reproductive functions and mothering, and not so much for growth.

Questions

1. If you have a bull and a cow with these genes, what would their calf be, big or regular?

It's too early to say. There's one important feature I didn't mention, the practical application would be curtailed if the calf grows too fast in the uterus. To prevent this from happening, we can link growth hormone gene to another gene which can be turned off and on, triggered by something. In this case, we trigger it by feeding certain ions, like zinc. The chances of getting a larger animal would be very great. It is totally impractical to propogate these animals. What I am suggesting is that we manipulate genes so animals are normal at birth, we turn on the gene during the growth phase, turn it off, put cattle into the feed lot to finish and ship them.

You would use the genetically normal stock to be the mother, the only animals to be giants would be market animals.

2. Will you comment on Synchromate-B newly licensed in the U.S.

This product is a steroid implant placed in the ear. It acts as a second corpus luteum. When the corpus luteum regresses and dies, the animals don't come into heat over three or four days. It causes cows to cycle if they're close anyway, prostaglandins do not do that.

It is not yet licensed in Canada.

3. How effective is visual detection using chin ball markers or paint when cattle oilers, magpies, trees, fences and so on can remove the marks?

Anything animals can brush against and seeing as the animals are losing their hair at this time of the year anyway, can be misread as a positive sign. Behaviorally, you will see a group of animals start to move around together. Some are trying to ride other ones that are standing around. The ones standing are in heat, the ones moving around with them will be in heat next. As they go out of heat, they drop off and those about to come into heat join in, so you see these animals moving around together.

The final sign is when an animal stands to be ridden. Record the ones following around. It becomes easier to detect heat when you have larger numbers. If you have one animal in heat, you will see a dozen interactions with other animals. If you have two animals in heat, the number of interactions per animal rises to 40 or 50. The implication is if you have more than one animal in heat, it is easier to detect.

PASTURE IMPROVEMENT AND REJUVENATION

Mark Kilcher, Pasture Management Researcher (retired)

This title was assigned to me, but I don't like it. It implies that there are ways, if not even easy ways, to mend a worn-out pasture which has been abused, overgrazed, depleted, exploited and just generally "run into the ground". If you have nothing left but a few poor blades of grass, lots of weeds, gopher holes, cow pies, bare spots, bits of rusty wire, there isn't a person in the world or a miraculous procedure that can restore that pasture to its original shape.

A lot of the trouble is that many of us were born into this state. It's almost natural because, as far as we know, it has always been that way. A person's lifetime is not very long. A pasture's lifetime can be longer but probably it is a lot shorter.

A good natural or native grass pasture can be ruined in a half dozen years. Many of them were ruined in that time years ago - perhaps before your tenure. It took nature, with all of God's help, to put it there. It took maybe thousands or millions of years to achieve. Along comes man and decimates that structure in a decade or less. I wonder who we thought we were. Maybe many of our predecessors or even some of us didn't and don't really care about tomorrow or the next generation.

I know all of this sounds pretty sour, pretty negative, like a general condemnation. It has to be acknowledged that many of you are not among the guilty, were fortunate enough to have come from a line of good grass and pasture managers. What I am saying is what I have generally observed.

This is a fairly lengthy preamble to the specific topic I have been assigned. I thought it was necessary so that we all know what we're talking about or at least understand the parameters in which I am prepared to talk about improvement and rejuvenation, the old saying that "a purse cannot be made from a sow's ear" is applicable to pasture improvement and rejuvenation.

First off, we have to accept that a pasture or pastures, can be of different sources. For the most part, the days are gone when cattlemen had an unlimited amount of native grassland, be it open prairie, parkland or even mostly bushland. Now there are neighbours, grain fields, fences. Pastures to me, can consist of complex combinations of native grass, seeded or tame pastures, which in turn can be composed of perennial plants or annual crops like oats or fall rye. Can you see why I wasn't wild about the title of this talk? Simply "pasture management" would have been a better title. I'll take that liberty.

There is a limited opportunity to do much about improving natural pastures. If you are lucky enough to have one that is still in good shape you already have the know-how or it wouldn't be in that condition. You are not going to be able to run experiments 'cause you have other more important things to do. Let research stations do that and make the mistakes, or other public agencies. That's costing you enough without getting into it yourself. Some of the answers we came up with were too late for many producers. For instance, as long as

I can remember, the old rule of thumb was graze moderately, leave some carryover, only graze off 55 or 60 per cent of what's there. If you're growing grain that 60 per cent business doesn't make any sense, but if you want pasture the next year, and the next year, and the next year, from the same stand of native grass, you have to allow it the chance to continue its work. Natural vegetation can take a licking from drought, it can take a licking from overgrazing for a year or two, but add the two together and maybe stretch it for another year or so and it and you are in deep trouble. It'll take a long, long rest of no use to come anywhere near restoration. The good plants are gone. Fertilizer or chemical sprays don't have any grass seed in them to replace those plants which have gone. Admit it - they're gone! The only recourse is to break it up. And I know what that means. That means so much cost that I'm going to "put her down to wheat" to "make her pay". That's really what has happened in many instances. I'm not against wheat, but you have a hard time getting a steak out of a bushel of wheat.

If a native pasture hasn't been ruined, but has been somewhat abused, then some things might help. Before anything is done culturally or mechanically, the first decision is to cut back on the stocking rate so that only half is grazed off. Spraying out broad-leaved weeds has merit. They only compete with the edible plants and mostly provide nothing of grazing value themselves. Fertilizing native grass is a loser. The Weeds will respond like crazy.

Few people practice deferred seasonal use. I know the situation. You've had those critters around since November eating up your stacks, you've been tied to the clock all winter; the calves are coming, the weather will be getting nice; and you're tired of mud, manure and running a cow and calf hospital. So it's natural to shift your responsibility to the pasture. But wait a minute. That native grass had a tough winter also. It was probably overused last summer and fall. The plants were pretty tired and maybe even sick. They'd love to have a spring to see if they're still alive and maybe do a little recuperating and catching up. The snow goes, the sun gets warmer, the soil starts to lose its frost or even warm up. The plants stir a little, maybe peek out and moan, "Good God, here come those damned cows already".

We have repeatedly shown that letting native pasture have six weeks before grazing starts is a good investment. I know what this means. It means you aren't going to start grazing until at least sometime in June. We do most other things by the calendar or by the season or by the stage of growth. We seed grain near the optimum time, we spray grain at the right stage, we start swathing at nearly the right stage, we deep band fertilizer in the fall, we summerfallow when it's the right time. Why don't we graze and manage our pasture the way we know it should be done? We've spent a day discussing the virtues of good husbandry in breeding, low labor feeding, good nutrition, health care and even computer use. I'm saying not enough attention has been given to pastures and their management.

Getting back to this six week grazing deferment for native grass. Obviously this is going to necessitate some alternative source of feed. That alternative source has to come from some seeded pasture. It's no accident that seeded pastures grow earlier and faster, produce more feed, can stand more grazing pressure, respond economically to fertilizer.

It's also no accident that a good seeded pasture that is saved for fall and early winter use provides more feed of higher quality than does a native pasture.

By now, you know I'm really talking complementary grazing systems. Systems can be complex, sophisticated, integrated and all the other "imaginated" arrangements. But I'm not talking about anything fancy. Just a bare-bones simple arrangement that uses both native and seeded pastures in an ultra simple way as to get the most out of both of them while maintaining the condition and productivity of both and doing a favor for your livestock and yourself at the same time.

We hear about good milk flow for the benefit of the young calf, we are aware of the desire to flush cows for breeding. A good tame pasture in May and June can do that for us. The calves will love it, the cows will love it and the bull will love it by breeding season and certainly that native pasture is going to love that six week early vacation.

I really believe that the pasture season can be stretched by two or three months so that the wintering and feeding period can be minimized in turn. It will differ depending on your location. Winter lasts longer in northern and eastern areas of the province than it does in the southern and western regions, but the principles of management, grazing, wintering are relatively the same. Seeded pasture can add grazing time to both ends of the season. In the northeast pastures should be able to provide mid-May to early November grazing while in the southwest we can normally expect pasture performance from early May till late November or early December.

There will be those among you who are scoffing to yourselves because you are now getting ten months out of the rangeland. I can drive from Swift Current to Medicine Hat almost anytime of the winter and see cattle on the range here and there. In some instances, maybe that makes sense. You may have a few sections or even a township or so at your disposal, but most of Saskatchewan's cattle people are confined within tighter fences with limited room to manoeuvre. A lot of us use community pastures to some extent, graze stubble when the pasture closes down. There are various systems and feed sources, but it's probably safe to say that everybody can and should be using some seeded grass for early spring grazing.

We hear a lot about stress and sometimes tend to shrug it off as a short-lived occurrence. Cattle are no different than people, native grass is no different than cattle or people. We are all living organisms that have a limit of endurance. Put a cow under the stress of a winter, a new calf and upcoming breeding. She'd better have some good pasture to go on as soon as possible come spring. It doesn't make sense to keep her under stress by putting her out on native grass which is under stress itself. Something will have to give. Something does and it's usually open cows and small calves at weaning.

I've done a lot of rambling in this delivery. I hope you will leave here remembering:

1. Use high-producing early growing seeded pastures for the first six weeks.

2. Stay off of native grass during those six weeks.

3. Avoid overgrazing or taking all of your native grass growth in that summer and fall grazing period.

4. Provide for some form of fall and early winter grazing.

5. Have a hard look at using fall rye or oats for emergency early grazing.

SECURITY IN CATTLE DEALS

Gord Wells, President, Agdevco

When you're looking at any kind of transaction, two people have to be satisfied, or you haven't got a satisfactory deal. It's important to look at security for buyer and seller.

Security is the assurance or guarantee that when you sell your product, the buyer will pay you, and that his cheque will be good.

When you sell your livestock, the usual transaction is by cheque, and that's common sense.

What is so amazing in this business is the amount of trust that's put on the cattlemen in these deals, usually by word of mouth or by a handshake. However, this is a good way of doing business only when you're dealing with people you trust, you know, and who are going to be around for some time to come.

There are however, some common sense business practices cattlemen should consider as part of their selling package.

Know who you are dealing with. Are they bonded livestock dealers or agents? If not, why not? Even if they have a license, if you haven't dealt with them before or have never heard of them, phone Saskatchewan Agriculture's Animal Industry Branch (Co-ordinator, Livestock Inspection) and check to make sure there are no problems associated with the company or people associated with the company. And don't feel embarassed about checking or asking the buyer where his license is.

Know how they are paying you and when they are paying you. Most businesses will do a credit check before they complete the transaction. Once you know your buyer's bank, your bank can do a credit report. Credit reports aren't foolproof, but they'll give you a good idea. We always do a credit check. You may even wish to use the services of a commercial credit firm such as Dunn and Bradstreet. This won't necessarily help in deals between cattlemen, but will with firms like abattoirs. Whichever method you choose, at least take the time to make sure the cheque will be honored when you cash it, before you make the deal. Not after.

Foreign sales. These are probably the area of greatest risk, the most complicated and where we are most vulnerable. If I have one message, it is be cautious when you're selling overseas. The handshake may work here in Saskatchewan or in western Canada, but once the cattle are gone, and they're in Chile or Mexico, you can forget about getting them back, for health reasons. Plus your bargaining power is gone.

Our own company relies upon the Irrevocable Letters of Credit, confirmed where possible, which must be opened on our bank in Regina, before we begin to choose cattle. These letters require a prepaid bill of lading; an invoice listing number of cattle, with breeds; certificate of origin guaranteeing the animals are from Canada; documents from Health of Animals, stamped by the embassy of the country being sold to; and a pedigree. Once these have been presented, the seller will be paid.

Before shipping, study the letter of credit carefully because it states conditions, and if conditions are not followed exactly, you won't get paid. I'm sure many of you will know of foreign cattle sales in the past to Chile, Korea or England where somebody did not get paid and others were left holding the short end of the stick. Experience has proven

that usually a con man was involved. They're a dime a dozen and they're everywhere. Protect yourself by knowing who you are dealing with, and if you have any doubts, by being paid before you let animals leave the farm.

Export sales of cattle is not something you can do on a Sunday afternoon. It's a continuous day in and day out activity of hard slugging with the odd success that keeps you going. The glamor is short lived as the reality becomes known.

What about consignment sales in foreign markets? In a word, don't. I've been involved. I have had first hand experience. Once the cattle are thousands of miles away from where they belong, your bargaining position is all but gone. And you can't get the animals back because of Health of Animals' regulations. It becomes a salvage operation, and the costs can be horrendous.

We don't often think of insurance as security, but I strongly believe in value. I consider it an investment which I hope I never have to collect. Insuring your livestock whenever it is practical and available should be an automatic condition of any livestock transaction. Strive to keep your claims down though because it will benefit you through lower premiums. Select a reputable livestock insurance company or agent, and there are some good ones in the province now. The cheapest deal initially may end up costing more in the long run.

Finally, guarantee your product. Be proud of it. Don't ship it out without it being pregnancy tested, or semen tested or without the pedigree. You would not believe how frustrating it is to change pedigrees at the last minute or semen tests don't come out.

I'm sure many of you may be surprised to think the buyer is concerned about security. Look at it from his point of view. It's an investment which he expects to profit from. Not at your expense, but because he believes he can provide a product or service that's in demand. The buyer then looks at security three different ways. Security of quality. Value has been received for money paid and trust is established. It relates to all segments of the industry, right up to the consumer. You look for security of payment. The buyer looks for security of quality. Security of supply. The product will be available over the long run as the market demands it. This is always difficult. Security of demand. The market will continue to exist, even though it changes in a number of ways over time.

Look at security from all points of view to establish and retain a healthy industry. The various segments that go into making your industry should complement one another so you build on each other's strengths and work to remove weaknesses. The glue that will keep the system strong is profit for you and the people you deal with, but not at the expense of someone else, but because there must be an investment of either money or labor, or both. Those that are prepared to take the risks can most benefit, but the exciting part is that the risks can be shared and so can the opportunities. By playing on a strong team, your industry will continue to adapt and the security of it is going to be assured for a long time to come.

ELECTRONIC CATTLE SALES

Stuart Macdonald, Saskatchewan Wheat Pool

Livestock marketing has basically not changed in North America since the early 1900's. At that time a system of large terminal markets had been established in both Canada and the United States.

Looking at the system today, we can understand why many livestock producers and others consider it to be old and ineffective. Certainly the large terminal markets do not have the influence they once had in terms of volume or in establishing livestock prices, but for the most part it is the system of markets that was developed in the twenty's and the forty's that still are used to market the majority of this province's livestock production.

This does not mean that new and innovative marketing techniques have not been developed or tested. Over the last five or six years, in both Canada and the United States, a number of interesting experiments have been conducted with straight computer sales of both slaughter and stocker and feeder cattle.

The tests prove that mechanics of electronic sales work, and work well. They prove that livestock identification by grade or classification can be clearly established and more significantly they prove that it is not necessary to operate a stockyard facility in order to provide the same function to livestock producers.

The question then is how do you introduce a new marketing system when the very people who are expected to introduce it are part of the present system?

The livestock industry is very resitant to introduce this new technology. The blame, however cannot be entirely shifted to the marketing sector given the uncertainties of the industry as well as the uncertainties of government involvement.

An example of this type of environment could be the situation the Livestock Division has experienced since the original design and implementation of the Division's computer system. During the five years from design to implementation, many changes took place in the livestock industry... changes had a significant impact on the system we now have in place.

The original design specifications called for three key design functions, which would be introduced to the system in three phases: phase one - operations; phase two - accounting; phase three - livestock marketing.

We have, completed the first phase and will have completed the second by the end of this year. The third phase has now been placed on hold simply because it was to be designed to handle the sale of slaughter cattle and, the majority of slaughter cattle sales in this province are now being conducted by the Stabilization Board.

A simple description of the third phase would be that we intended to list slaughter cattle for sale through our stockyard mini computer which in turn would communicate the information to the main frame located in Head Office. The main frame, in turn, would provide the listing to various packing plants through a terminal in each plant's head buyer's office. We have not shelved the idea completely as we are now looking at a possible application for stocker and feeder cattle.

New livestock marketing techniques do not come easily and certainly the methods we use in Canada to describe, grade or classify cattle do nothing to help the situation.

This is one of the major draw-backs to introducing electronic livestock sales particulary as it relates to stocker and feeder cattle. Because of this, we are developing video livestock sales as a first step in our move towards straight computer sales of stocker and feeder cattle.

Video sales allow livestock producers to offer their product for sale to more potential buyers, in a more direct route at a fraction of the cost of the present system. At the same time, video sales allow the most important aspect of stockyard operations to take place - the open, competitive bidding of an auction sale. Video livestock sales allow producers to participate actively in the sale of his cattle by simply allowing him to prepare his cattle for taping, by describing his cattle through a personal interview, and by deciding the sale time, while his cattle are still at home, whether or not to sell.

The advantages to buyers are as numerous and range from arranging devlivery dates, to less stress and sickness, to having access to more cattle to buy. As well out-of-province buyers see and participate in a sale hundreds of miles away.

While we have talked in terms of computer and video sales as two distinct marketing concept, also be aware that it is now possible to combine the two into one. There is a micro computer available that uses both systems within one unit. What the exact implication of this particular equipment is in terms of livestock marketing, is difficult to judge. However, we are convinced that all this new technology will be used in one form or another as time goes on.

We already know by using this new technology that we can substantially reduce marketing costs that we can provide more competition, and that we can provide a more effective and efficient marketing method that benefits the whole livestock industry.

I believe that this video cassette tape and the equipment that produced the livestock sale contained on it can be the first step to completely revolutionize the livestock marketing system in place today. A marketing system which has served the livestock industry well over a long period of time, but one which now must give way to new and better ways of livestock marketing.

Questions

1. If you sell your cattle and they're still on your farm, who transports them and pays for the transporation?

Under today's system (video sale) we would ask you to deliver your animals to the nearest Pool stockyard for weighing. Then the buyer would take over. In the long term the system will adapt to you. Some day these cattle will be weighted right on the farm.

2. The cost of transferring ownership is fairly expensive. Will this video sale allow producers to keep cattle on the seller's farm to do things such as vaccinate and change ration at the buyer's direction to reduce the cost of transferring? The seller would receive a premuim.

The costs are high (transporation, stress etc.) and we are trying to reduce these costs through video sales. The last part of your question is obviously something new. I hadn't thought of that application. It is interesting and we could think of something like that. This kind of marketing lends itself to setting conditions. We'll consider your suggestion.

3. When you sell through the yard, there's a yardage fee. What is the fee to sell through a video sale?

The charge for a video sale is: 25 to 75 at $7 per head; and over 75 head, $5. We still don't know if these are too high or too low.

4. Is there a charge for weighing cattle after the sale at one of your yards?

No, the tariff covers all these fees associated with our part of the marketing.

5. If you decide to accept the sale prices, is there a basic fee?

Yes, $3 per head for coming out, taking the recordings and the production work.

6. Has anyone declined?

Yes, two or three individuals out of three sales.

7. When do you see sateliting coming into other parts of the country?

We want to do all our experimenting and learning before we move into other parts of the country. We'll be evaluating all summer, then take the next fall production quality and quality from equipment has to be improved.

8. What about professional buyer resistence. When will it be overcome?

Some are using the sales now. No-one has been disappointed with quality or health of animals sold through this system.

HOW TO PICK A BULL FOR REPRODUCTIVE PERFORMANCE AND HOW TO FEED IT

Dr. Glenn Coulter, Agriculture Canada

Fertility is five times more important than growth rates and ten times more important than carcass quality when selecting bulls.

If we could increase the calf crop by five per cent we could increase our animal income by $267 million. We could produce the five per cent by improving the bulls we use for natural service. If we look at bulls with low serving capacity, we find that arthritis, penis damage, overgrown feet and small, soft testes cause about 30 per cent of herd bull's reduced capacity, and 20 per cent of young sires.

So look for testicular size, semen quality, sexual behavior and animal structure when selecting bulls.

The weight of the testicles is almost parallel to sperm production. If we can estimate testes weight, we can get a good idea of sperm production. Scrotal circumference and weight are closely related. If the measurement is taken accurately, it's a good estimate of the weight of the testes.

Testicular size

There are two or three techniques for taking measurements, each with different standards. A year ago, a single standard was set for measurement. Start by palpating the testicles down into the scrotom. You have to eliminate all the wrinkles and have the scrotum as smooth as possible. Cradle the testicles in the palm of your hand, place tape around the largest part of the testicles, put a moderate amount of tension on the tape.

You can get inaccurate measurements if you grab the neck of the scrotum. This will give an inflated measurement. Another wrong way to measure is to hold the testes and scrotum with the thumb tending to push the testes apart, thus giving a wrong indication of size.

Bulls grow quickly between six months and 15 or 16 months. After that growth rates slows down quite substantially.

There is also a wide variation of testicular variation at any age. At the age of two years for example, testicular size ranged from 19 to 47 centimetres.

There's a wide range of size between breeds too.

Breed	Age 1 year	Age 2 years
Simmental	35.9	38.7
Aberdeen Angus	33.8	37.1
Maine Anjou	33.6	36
Charolais	32.9	36.3
Hereford Horned	32.8	36.1
Shorthorns	32.4	34.9
Hereford (polled)	32.2	35.6
Blonde	30.6	35.6
Limousin	30.3	32.1

Taking the extremes, there are about five centimetres between the Simmental and the Limousin. That can make quite a difference in sperm producing capacity. Our recommendation on testicular size vary according to the breeds.

The shape of the scrotum is important. The best shape is the long, pendulous scrotum with a narrow neck. Overweight young bulls tend to have a straight side instead of a narrow

neck. The ones to stay away from are the ones with the scrotum close to the body, because the sperm have to have temperature regulation.

Actually few bulls are sterile but many are subfertile. Testicular size helps identify these bulls but it is only one factor. Scrotal circumference, however, is the most accurate way of predicting puberty in beef bulls. If we group a variety of bulls satisfactory, questionable and unsatisfactory rated on semen quality, no bulls with less than 30 cm scrotal measurements were satisfactory. At 34 cm, 50 per cent were satisfactory; at 38 cm and up, 88 per cent were satisfactory.

Semen quality

Sperm cells are produced in the tubules, move through the collecting tubules up into the epididymis and up through the duct system.

Sperm start out as round cells that mature as they move towards the lumen. (The lumen is the centre of the tubules). As they move to the lumen they change into what we normally think of as sperm cells, are released and move into the duct system.

Abnormalities occur in these areas. Secondary abnormalities occur as sperm move through the duct system.

There are very few sterile bulls, but a semen test can find the ones that are. The higher the level of sperm abnormalities, the higher the chance of sterility.

Problems are not limited to any one breed; all breeds have problems.

Libido (Sexual Drive or Behavior)

We have field tests on right now to study various reproductive behavioral traits and how they are related to fertility.

In Australia where work has already been done on this topic, bulls were turned in with restrained females and the number of services in 40 minutes counted.

The low group which is 0, 1 or 2 services in a 40 minute test had a low pregnancy rate; bulls with medium or high-serving capacity produced higher pregnancy rates. These bulls were all used under low breeding pressure. I suspect the high-serving capacity group would do as well under greater breeding pressure, the medium group might tend to fall off somewhat.

In our tests we use four testing crates to restrain the heifers. They are not stimulated to be in estrus. We put eight bulls in with the four heifers and monitor their sexual behaviour for a 20 minute period, then they are put out and the next group comes in. The group that is about to be tested next is in the pen next to the testing pen so they can observe and possibly be stimulated when they go in.

We look at four different characteristics. We look at interest which is defined as any time a bull shows sexual interest in one heifer and then goes on to the other. He can go up and down the line several times. Other bulls will go to one heifer and stay there.

We look at attempted mounts, which is any kind of an aborted mount where the front feet come of the ground but the mount isn't completed. We look at mounts, and actual services. After rating than we put these bulls out in multiple sire breeding situations, blood typing the calves to determine actual parentage, and acquiring our information this way.

Physical soundness

This means a physical examination,

including a rectal examination to check the seminal vesicles to make sure they're normal, not infected (the seminal vesicles are the storage units for the semen). You need to examine the penis and see if there are such things as so called broken penis.

One thing that isn't given enough attention, is that when a scrotal circumference measurement is taken, there is a great deal of emphasis put on palpating the testicles and epididymis to see if they're normal. Quite often there are bulls coming out of bull sales that have soft testicles, an abnormal epididymis. These problems come out under the name of scrotal circumference, but there are a lot of bulls that have other types of abnormalities that may affect their fertility.

The future

We're starting work using infrared thermography to check the temperature increases until you get to the top where the blood vessels enter the scrotom.

Testicles are in the scrotom for a very specific reason: temperature control. They have to be cooler than body temperature for sperm production.

Amount of condition

Condition affects reproductive capacity. Information from Saskatchewan community pastures show that 40 per cent of bulls were satisfactory when they were going into the community pasture. This increased to 70 per cent when they were coming out. These were two year old bulls bought at spring bull sales, quite likely carrying a considerable amount of condition. If that was my pasture and my herd, I wouldn't want to be using bulls where only 40 per cent of them were useful.

Also remember, you get the improvement through the breeding season, but you can be sure the improvement didn't occur the day after they went in. They were probably well along in the breeding season.

Because of this and other information on fitted bulls, and the indication that over-condition might be undesirable, we have experiments on condition and bulls. We fed Hereford and Angus bulls two levels of energy. The high energy ration was 60 per cent barley, 10 per cent oats, 10 per cent feed bulk and alfalfa straw cubes. In some cases we just used alfalfa cubes. The medium energy diet was cubes alone. We used epididymal sperm reserves as the criteria. The first experiment was with Hereford bulls. We put them on this ration in the fall when they were weaned. They were carried through on the high plane until 21 months of age, and then they were shifted back to the low plane, to reproduce the situation where bulls are fat when bought at bull sales and then let down.

The other group were on the medium level ration all the way through. In 1977 the Hereford bulls had a 75 per cent reduction in epididymal sperm reserves, compared to the medium energy diet. In 1978, they had a 35 per cent reduction. The average is 59 per cent. Those bulls were producing less than half as many sperm sells than bulls carrying a low amount of condition.

How much condition?

The high plane bulls in this case were carrying a little over 10 millimetres of backfat. The Hereford bulls last year at the Edmonton Northlands Show and Sale averaged 14.7. I'd say that was fairly characteristic of the industry. The low plane bulls, on medium energy ration, were down around five millimetres of backfat.

What happens to the Angus?

The results are not quite as dramatic. They had a 13 per cent reduction in the first year, and 14 per cent in the second year.

When does this happen?

We looked at 15 month old bulls. We used 143 bulls in the study, and the same high plane and low plane within each breed. We chose 15 months because that was the age we'd expect those bulls to be used in a natural service breeding program.

Hereford

In 1980 - 34 per cent reduction in sperm reserves on high energy. In 1981 - 44 per cent reduction. In 1980 the medium energy bulls had 1.5 millimetres of backfat, high energy bulls had five millimetres. These were not fat bulls.

Angus

No effect in 1980. But in 1981, there was about a 50 per cent reduction. We looked at yearlings at 12 months of age when they were coming off the growth performance test. We thought it was perhaps the extra three months that had done the damage. No such luck. Using the same experiment in 1982, there was a 39 per cent reduction in sperm reserves in the Herefords and a 31 per cent reduction in Angus sperm reserves.

On other experiment that is just half completed, is another comparison of bulls fed medium and high energy rations. We were going for extremes in this experiment looking for the mechanism that is involved in reducing the sperm output in these bulls.

The backfat in the medium group is 5.4 millimetres and in the high group is 39.9 millimetres. So these bulls are obese. It is not unusual to find bulls that fat and fatter at spring bull sales. If I had my way, they'd all be culled.

Total sperm reserves in the medium group was 40.6 billion, in the high group, 19.8 billion, twice as many sperm cells in the medium group. Sperm motility 66 per cent for the medium, 35 per cent for the high. Abnormal sperm - 22 per cent in the medium, 64 per cent in the high. Total services 55 services for the medium, five for the high.

These results are conclusive. Feeding high energy diets is detrimental to the sperm production of bulls.

PFRA COMMUNITY PASTURES AND BREEDING PROGRAMS

Fred Kraft, PFRA Breeding Program

By way of introduction, the PFRA Community Pasture Program began almost 50 years ago as did our breeding program. At that time it was recognized that a breeding service was a logical complementary program for the Community Pastures. Since 1938, purebred bulls have been provided for a fee so that patrons could improve and enlarge their herds.

PFRA's policy in allocating grazing privileges favors breeding stock. This is reflected in the fact that approximately 110,000 breeding cows pass through our gates each year. To accommodate this number of cows, we provide about 4,000 bulls of which 3,000 are owned by PFRA and about 1,000 are rented.

PFRA has a rigid culling process and we cull six hundred bulls each year. Reasons for culling are many, but some of the more common are age, feet and leg problems, injury to testicles and penis, and eyesight problems. Semen tests are carried out as required and are used when the bull appears to be sound in all respects but we suspect testicle damage from frostbite, injury, fever or when we get an abnormally high number of complaints from a particular breeding field.

Many bulls are also culled during the breeding season for libido reasons. Our pasture managers keep a close eye on the bulls during the season and those that don't display active breeding habits are canned. Also, bulls that develop foot rot or sustain injuries and subsequently develop high fevers are generally removed from the breeding field and treated elsewhere. Sometimes these bulls are replaced but often times they are not. We feel that it is better to remove these bulls so that they are not servicing cows when they might have low semen counts. Furthermore, these bulls seem to respond to treatment better when removed from action.

We buy about 700 bulls annually and spend about $1.5 million in the process. Our bull buyers buy purebred Charolais, Hereford, Simmental and Angus bulls, and rent Limousin and Maine Anjou bulls according to patron demand. Conformation, testicular and backfat measurements as well as performance data, particularly birthweight and calving ease are considered when purchasing these bulls. One of our problems is that some of this information is not available at the time of purchase.

Long yearlings are bought in the fall from private individuals and are grown out at one of our two bull stations at St. Lazare, Manitoba and Maple Creek, Saskatchewan. These bulls are placed into service the following spring. Two year old bulls are purchased at the spring sales and placed into service that season. In the past we have purchased more mature bulls in the spring than we did long yearlings in the fall.

We are slowly changing our policy on this approach for reasons of economy and reproductive performance. It has been our experience that during the first breeding season, the bulls we purchase as long yearlings and grow out ourselves generally out-perform most of those two-year-olds purchased at spring sales. The bulls purchased as long yearlings appear to have a higher libido and better mating ability. Many of our pasture managers have indicated that a lot of spring purchased two-year-olds do not perform as they should until late in

the season and even then, do not seem to have vitality that the other bulls exhibit. I don't think I have to explain further why purchasing bulls that don't perform well during their first breeding season is neither conducive to high reproductive efficiency nor economical for both PFRA and our patrons.

Consequently, it is PFRA's intention, and we have already started, to purchase more and more bulls as long yearlings and grow them out ourselves. It is our desire eventually to purchase 2/3 of our total bull requirement in the fall and top off our inventory with spring purchased two-year-olds. We will always have to buy some two-year-olds in the spring because we don't know our total bull requirements until late February when grazing deposits are submitted. It is only then that we know how many breeders we will have for the upcoming season after which we may buy accordingly at the spring sales.

We try to keep a cow-bull ratio in the neighborhood of 28 to 30 cows per bull. This, I think, partially explains why conception problems are not a serious problem on our pastures in the sense that most cows placed in breeding fields are impregnated sometime during the season. As you know, this is only part of the success story.

We have found that even on those pastures with conception rates in the 90 per cent rate, the length of the calving season varies from 50 to over 100 days which is certainly nothing to brag about. A lengthy calving season could result from poor bulls. But before we blame the bulls we generally investigate other possible problems. It is interesting to note that only a small number of cows in each field are late calvers. On further investigation of the complaints regarding conception problems and lengthy calving seasons, it if often surprising to find out that the cows with conception problems are not spread out amongst all the patrons who had cows in that field. Instead they are most often owned by one or two individuals.

And finally, when we question the pasture manager as to what was so different about this fellow's cows, the invariable response was that although he couldn't detect any significant difference at round-up time, the patron's cattle were in poorer shape when admitted to the pasture in May than those cattle owned by other patrons. This suggests that many of the conception or late calving problems are related to the nutrition of the cow prior to admission to the community pasture.

Nutrition on our pastures could also be a large part of the problem in the other cases. Our pastures were constructed on submarginal lands and most of them consist mainly of native grasses. Early season tame grasses such as crested wheat grass and Russian wild rye often do not grow well on these poorer soils. Nevertheless, in some pastures we have adequate amounts of tame grass that produce well during the critical early months of the breeding season. On the other hand, we also have many pastures that are almost 100 per cent native grass which generally don't peak until mid-June.

Cattle are admitted to both pasture types in May. This does not pose a problem for those pastures where the cattle can be immediately turned out on the tame grasses. In this way the flushing process can continue uninterrupted through calving and until first estrus is showing. An early conception is likely. A potential conception problem does exist in native grass pastures. On these pastures, because the grasses often can't supply the brood cows energy requirements, the flushing

process is interrupted immediately after take-in and often does not resume until sometime in June.

This is a very critical period with respect to getting all cows in calf within a reasonable period.

Dr. Cates has recently made PFRA staff aware of just how critical this period is with respect to early conception. We intend to look at the number and location of our conception complaints to see if there is a connection between the pasture type and the number of problems. If there is a significant connection, then PFRA will endeavor to defer take-in dates until late May or early June so that the pastures in question are ready for the breeding cows when they are admitted.

Deferred take-in dates are a sensitive issue both with PFRA and the patrons. PFRA operates on a full cost recovery system and a deferred take-in results in less grazing days which means less revenue and in turn means higher fees. Also come May first or shortly thereafter, many patrons either have very little feed left or are about to start seeding. Consequently, retaining their cattle for another three or four weeks is not an attractive alternative. So a few bumps will have to be ironed out and trade-offs made in order to solve this problem.

We have followed the province's initiative and set up pregnancy testing at our corrals. We started last fall on a small scale at a few of our pastures and the good news is that it seems to be catching on. Several patron advisory committees from other pastures have approached us and indicated that they wish to pregnancy test this coming season. The patrons are required to pay for this service. However, we at PFRA have guaranteed that any costs over $2.00 per head will be picked up by PFRA.

These patrons realize the benefits of pregnancy testing in not only clearly identifying open cows which can be canned rather than fed through the winter, but also identifying the late calvers which can be canned in order to prevent a long season next year.

Pregnancy testing also helps PFRA in that if a large number of cows are found to be open then we can identify the bulls that might have fertility problems. We can then semen test these bulls and if they fail or are questionable, we can cull them immediately and also avoid feeding them through the winter.

The results of last fall's pregnancy testing indicated an average conception rate of 91 per cent and an average estimated calving season of approximately 75 days. Length of calving-season varied from a low of 45 days to a high of about 100 days. Therefore there is still considerable room for improvement by both PFRA and our patrons in order to further reduce the length of the calving season.

PROVINCIAL COMMUNITY PASTURES

Grant Griffin, Co-ordinator, Community Pastures East

Saskatchewan Agriculture, through Lands Branch, operates 54 community pastures for cattle. We're not a research operation, although we have co-operated with various agencies carrying out research projects. Thus, the basis for this presentation is observations from 15 years of working with community pastures and four years of fertility evaluation of Lands Branch bulls.

Breeding program and conception rate

Lands Branch provides a breeding program servicing between 45,000 and 50,000 cows using from 1,500 to 1,700 bulls. The current average cow/bull ratio is 30:1 with that ratio varying somewhat according to size of field, terrain and age and quality of bulls. Breeding season is usually 90 days, down from 120 days five years ago, beginning in June depending on patrons' wishes. We canvas our patrons for wanted conception rate and their responses have indicated a steady 90 per cent plus settling rate with a rather wide range on an individual herd basis. Many of our patrons report a 100 per cent conception rate.

Lands Branch has no control over the cows we service other than ensuring that they have adequate forage and water while on our pastures. Unfortunately, anything that goes wrong in the community pasture program is undoubtedly the fault of government bulls. Thus, in order to ensure that government bulls are as good as possible and to aim for that 100 per cent conception rate, Lands Branch has been fertility evaluating its bull battery. Fertility is not confined to the reproductive tract of a bull. It is the entire animal from the end of his nose to the tip of his tail and everything in between and it must all be in good working order.

Jack Hockley said that the bull is the baby of the bovine family. I have seen nothing to contradict that statement. If something is bothering a bull, the chances are that he will not perform adequately. No matter how good his semen quality, if he is hurting somewhere, a bull is more likely to look for a shady place to lie down than to check cows.

Bull must look like bull

How do we go about getting this fertile bull? There are several criteria used when purchasing or culling and all are equally important. First, visual effect: the animal must look like a bull; not like a steer that some steer-jocky can peddle into first place in a showing. A single word description is masculinity. Bulls are supposed to be burly looking critters and those who promote bulls as looking like good heifer producers or good prospect steer producers are fooling themselves and the public.

Bone structure

Now we have got this animal that looks like a bull. How is he put together? He must be correct in bone structure. Bone size must be adequate to carry his mature weight. We have done a lot of things to beef cattle, shortened them to fit a box; elevated and elongated them to look like race horses. Somewhere in between is a good-sized animal with a straight back, well-blended neck, head and shoulder, straight front legs, properly set rear legs and close enough to the ground that he can still graze comfortably. Gangly, modern bulls are those which easily dislocate shoulders, stifle hips, slip discs and generally have trouble getting the job done. Remember, as the song goes, "the head bone's

connected to the neck bone", and so on and the bones must fit correctly in order for a bull to travel well and service cows.

Weight

Now we have an animal that looks like a bull and has correct bone structure. How much weight should he carry? This is a major difficulty we encounter in our present system of two-year-old bull sales. It seems, if you don't bring out a bull with weight approaching the ton, nobody will bid on him; and Lands Branch is often guilty of this syndrome along with the public. Ideally, a bull should carry enough muscle to indicate meatiness and the potential to deliver well balanced carcasses, but must be in condition to go to work.

Often weight indicates fat and too much fat is bad. Not only is a fat bull in poor physical shape, but he may also have been castrated with the fitting ration. Two-year-old bulls bought by Lands Branch in the spring consistently lose 250 pounds or better by the time breeding season arrives.

We estimate that the breeding effectiveness of two-year-old bulls in community pastures approaches 25 per cent of their potential. They must get used to being with other new bulls, accept hay and grass as feed, and travel. By the time the average bull has lost his baby-fat, conditioned his muscles and often suffered pinkeye and foot rot, the breeding season is over. Bulls that are obtained in working condition do much better and breed closer to their potential in their initial season than do their chubby brothers.

Feet

Next on our list is feet. A university in western United States conducted a sheep experiment where they tethered the rams in the breeding fields and still achieved a high conception rate. It seems the cows we get in community pastures do not have the same nymphomaniac tendencies. Our bulls have to walk and to walk they have to have sound feet. Some will claim that feet can be trimmed to make a bull walk. Poor feet are second only to poor testicles and semen as reasons for our bulls being culled. Sure, you can trim feet to make them look good for a while and there are some experts around at trimming, but it is only a band-aid solution.

We find two main categories of foot problems: feed related and inherited. What we consider feed related are the soft, elongated, often flat hooves that require continued trimming and often lead to other foot problems. These appear most often in the British breeds where high two-year-old weights are achieved through over-feeding. The inherited problems are usually the curled-under outside hoof and the crossed-over toes, all too often found in European breeds.

Bulls with foot problems are poor travellers and when they do catch up to a cow, they have trouble mounting. Our pasture cowboys commonly report that bulls with poor feet will actually start to mount a cow and then change their mind. Poor feet usually are sore and again, a bull with an owie is no bull at all.

Reproductive system

Now, we have a masculine animal with correct bone structure, carrying working condition on good feet. Now we come to the crunch. Is he a bull? Does he have the necessary reproductive equipment? The fertility evaluation we conduct on our bulls checks the above points as

well as assessing the reproductive tract. This is no fancy test requiring sophisticated equipment and it is not done under ideal conditions. The Veterinary College will certainly attest to the often less than ideal conditions we subject their staff to.

The first part of the examination is a physical check of the external reproductive organs. This is a point on which I have a quarrel with some purebred producers. Why would you go to the trouble and expense of fitting an animal for a two-year-old sale and then have the buyer return him because of physical abnormalities? And these are obvious ones which elementary handling and observation will reveal, such as warts on the penis, deviation of the penis tip, growths in the scrotum and parts missing altogether. These types of things appear all too often in two-year-old bulls.

By the same token, why put an animal with undersized or minimum-sized testicles into your fitting program? There has been enough work done with beef bulls so there are no doubts that bulls past the year of age can be culled on testicle size. You are only fooling yourself and your potential buyers that a bull will improve with age. We're not talking about mine. We're talking about an animal that is born with his breeding potential already determined. We can interfere with that potential, but as yet there is no way of improving on it and I am not sure that would be wise. Any method of artifically boosting a bull's fertility is likely to be costly, temporary and wouldn't change the genetic potential.

Anyone with a good chute, a basic knowledge of beef cattle anatomy and the willingness to learn can do a preliminary check on the external organs and measure testicles. Our experience shows that passing this part of the test usually means we have got a bull.

One other essential attribute of the breeder is integrity. Be honest with yourself and your bull. Just as we don't like looking at the dial on the bathroom scale after Christmas, sometimes the tape is not flattering to that calf off your best cow.

The other parts of the fertility examination are an internal palpation of the reproductive organs and a semen check. This must be handled by a qualified practitioner. Again, these exercises reveal impediments to a bull being a good breeder. The finer points of semen evaluation are better left to the veterinarians on this panel.

While talking about breeding soundness, I can't help but take a swipe at the so-called breeding guarantee printed in most bull sale catalogues. The gist of it is, that after two months and before six months, a buyer must contact the contributor who may insist the buyer try the bull for another six months after which the contributor may test the bull at his place for four months. Here we have a minimum of six months and a maximum of 16 months to determine whether or not an animal is a bull.

Usually there is no mention of what constitutes a breeder. Does he have to settle one cow or 30? I submit this is no guarantee at all and should be eliminated as such. I know of no other type of business that would have the audacity to print such stuff and no other sort of buyers that would put up with it. With 75 cent beef and sky-high costs, a lot of beef producers would go belly-up while the bull is being checked out.

Lands Branch has bought bulls with a guarantee of full money back, in effect up to weaning of their first calf crop. We have also returned bulls as unsatisfactory breeders and

had the breeder insist we take him back six months later because he had settled the milk cow in that time. Somewhere in between these cases there is a practical guarantee.

Temperament

A final criteria for bull selection or culling is temperament. It can be argued that this has little to do with fertility and that may be true by itself. However, a bull that spends a portion of his time either looking for trouble or getting into it, has less time to settle cows. Also, temperament is passed on to progeny, and I have had some experience calving out and handling what are termed alert cows. I understand too that flighty cattle are harder to feed than even-tempered ones. In this respect, again integrity of the breeder comes into play. Tranquilizers may work well in the sale barn and showring, but they are not much consolation when you have a full grown bull belting your horse in the ribs.

That completes our picture of a fertile bull, a masculine-appearing, correct animal, carrying good muscle, good-natured and ready, willing and able to settle cows. Lands Branch has been accused of setting our sights too high and that our ideal bull is not required by the average Saskatchewan beef producer. I strenuously disagree. Time is of the essence these days and you need a bull that will do a good job in a short time.

Who can afford to calve out his cows even over 90 days or have calves that vary from 250 to 500 pounds at weaning? The thinking behind the saying, "a calf at any time is okay", is perhaps largely to blame for the problems the beef industry finds itself in today. Some time ago, a lady who runs a pretty successful seed-stock ranch in Wyoming lamented that if only beef producers used the same level of technology in their beef enterprise that they used in their grain operation, a lot of beef's problems would disappear.

Improving reproductive efficiency

A lot of my remarks appear aimed at purebred producers, but perhaps the responsibility for progress lies with the commercial producer. Unless the commercial people demand more efficient bulls we are unlikely to see much change. On the other hand, what is the point of supplying a super bull for a cow herd capable of producing at only 75 to 80 per cent? We no longer have the luxury of keeping a bull who needs 16 months to prove himself a breeder, nor can we afford to keep a cow just because she is the best looking cow or because her mother was a wedding present from Uncle Harry.

So much for the bull Lands Branch is looking for. What do we see in the future to find this bull and to generally improve reproductive efficiency?

Firstly, Lands Branch will shy away from modern bulls. We feel the pendulum has swung too far and the trend to longer, taller, leaner cattle must back up a step or two. Our experience with this type of bull says that they are harder to feed, and more subject to leg and foot problems than more traditional animals. Perhaps most damning of all is the fact that in our haste to get bigger bulls, we seem to have forgotten that he should be a bull.

Figures from the Manitoba Bull Test Station show that in the 1978-79 test, average scrotal circumference was 34.5 cm. The average for the 1982-83 test was 32.7 cm. This prompted one of the breed magazines

PANEL QUESTIONS

1. If a bull breeds a cow once, is that enough, or should he breed her more than once?

Cates: Once is enough, depending why the bull quits at once. If the bull is lured away fine, but if the bull just leaves to go rest in the shade, I would question his sex drive.

Coulter: I agree with Dr. Cates. Research shows in A.I. and natural service situations, you get higher conception rates with multiple services probably because of variations in ovulation times. The converse of the situation is the bull who finds his favorite female and doesn't breed other cows.

2. We have done a lot of work measuring the fertility of bulls in the herd. What have we done about cows, and what are your comments on the Barrister program?

Coulter: I wouldn't say there is no validity to the tests, but it is fairly limited. We don't usually think about the benefits to our cow herd of using a superior bull. A superior bull gives great benefits to his female progeny. Large vesticular size in the bull usually means the cow cycles younger, more regularly and thus have a more productive life. A bull with high libido passes this on to his female offspring too. Females in heat look for bulls too, it is not a case of the bull doing all the looking. These females show estrus long, and stronger.

3. Do the community pastures, federal and provincial, see themselves as innovators or followers?

Kraft: Both, PFRA is fee conscious, so we are leaders in a slow way and evolving way, following research and technology. For example, to semen test all bulls adds $2 to the breeding fee.

Griffin: We're cost conscious too. We've held our breeding fees down because we've increased the number of cows per bull. We've culled poor bulls and increased production (as discussed by Manns). Lead, follow or get out of the way. If it needs to be done, do it.

4. Are your bull buyers as knowledgable as you regarding back-fat, over-condition, etc.?

Griffin: I would say yes. At least as good or better. We have to buy bulls, they see a lot of bulls, and we have to buy a certain number of bulls a year. A farmer can go from sale to sale until he finds the bull he wants. We need a certain number right away in the spring, so we're bound to buy a dog now and then. I think when you're buying 700 bulls a year like PFRA or 300 to 400 a year like we do, I think the bull buyers are doing a good job.

Kraft: If you got the impression that every two-year-old bull we bought in the spring sales was in doubt, that's not the impression I meant to give. We do get a lot of good bulls. But the incidence of these two-year-olds not performing in their first year is certainly higher than the incidence of the long yearlings not performing well their first year.

5. Many sales are now offering yearlings at 15 to 16 months of age. Are you going to look at them for community pastures?

Kraft: Yes, especially in pastures where we're breeding heifers. We've actually been moving this way the last year or two, and we're going to continue to do so.

6. Do you have cost comparisons between the two?

Kraft: It is marginally cheaper for us to buy bulls as long yearlings in the fall. We can buy hay and pellets cheaper than farmers because of the bulk quantities we can buy in. This wouldn't necessarily apply to farmers. This compared to performance is small.

Griffin: Cost differences may not be significant, but you can keep long yearlings longer so they are still in your herd as 10 to 12 year olds. The longer you can keep your bulls and the fewer changes you have in your bull battery, the cheaper your costs.

7. How permanent is the damage done by heavy feeding, and how long before it can be rectified?

Coulter: I can't give you a good answer on that. That work really hasn't been done yet. The younger you get them off the higher energy rations, the better off he will be of his recovering. With a two-year-old bull you get gesticular degeneration. The older the bull is, the lower his chances of recovering. The ones in tests we discussed previously the testes were soft and mushy with no resiliency. We are talking averages only. Those that do recover can take as much as two years to get back into good breeding condition. From a strictly economic point of view, no one can afford to hold bulls for a year or two waiting for them to be useful.

Griffin: Regarding fertility tests, in order for a bull to be rated unsatisfactory he has to have a severe abnormality or have poor semen and poor testicles. If we find they have so-so testicles and their semen appears not bad, they go into the questionable category. If they have good testicles and they just don't do well in their semen test that day, they go into the questionable category. The ones that have small testicles stay that way. The ones that have reasonable size testicles and just a poor semen sample quite often will come up into the low-satisfactory category.

8. Dr. Coulter your charts and tables yesterday indicated a difference in scrotal circumference between Simmental and Limousin cattle. How much of that difference is made up of spermatic tissue and maybe even scrotal shape itself?

Coulter: Some research indicates Limousin testicles are longer so a scrotal circumference measurement isn't an accurate measure of the amount of sperm producing tissue. We're working with the Manitoba Limousin people on research, but no one has demonstrated to me, so far, that there is any difference in gesticular shape between breeds. I won't say it's not there, but I haven't seen it. I would say in terms of scrotal content, the only variation there is, is fat. We see a great range in the amount of fat in the neck of the scrotum. We see a 35 per cent increase in the fat of scrotal tissue of fat bulls compared to thin bulls. Breeds do not vary much in shape of the testicle.

9. Are you providing any direction for patrons for bulls with maternal qualities (like weaning weight) for replacement heifers, instead of a terminal cross for the feed lot?

Kraft: Breeds in a pasture are voted on by pasture patrons. Most pastures have two, some have three. It's their choice and depending on the kind of cows they have, they at least have a good matrix.

Griffin: The other thing to remember is that these are multiple sire herds so we can't control which bull breeds which cow.

10. What does subcutaneous fat have to do with reproduction versus back-fat, and as well, most of the research has been done on British breeds, what about the continental breeds?

Coulter: All the information I have is based on Hereford and Angus cattle because that's all we have available at the research station. I would like to be able to repeat these tests with other breeds and I intend to pursue this. Continental cattle have internal fat and maybe the same thing is happening to fertility without it showing on the back-fat measurements.

11. What happens to bulls with the stress of moving, and the trauma?

Kraft: Trucking bulls is very stressful and they do lose weight. If we can, we drop them off at the pasture on the way back from the sale, although this isn't always possible. Otherwise, we take them to marshalling yards then put them on different rations. We try to move them as little as possible. Once they get to the pasture, they either die there or their next trip is to Canada Packers.

Griffin: We operate a little differently than PFRA. We move our bulls every winter. We have 17 bull stations around the province and bulls are wintered there then shipped out to the pastures in May, and leave them there until late August or early September. Fertility and conception rates doesn't seem to suffer. Our conception rates compare favorably with PFRA's and Dr. Cates has shown that there is very little loss in fertility when you move a bull. We have some pastures that insist we not deliver the bulls until the day the pasture opens, and there is no difference between these pastures and others.

Coulter: We have to minimize stress regardless of its form. Stress will mess up the endocrine system of the bull and when this happens, there's a good chance it will affect the testes, sperm production and semen quality. I consider feeding to a large extent is a stress because it leads to overweight, carrying the extra weight on a frame not meant to carry the extra weight.

12. What is the PFRA policy on free choice mineral feeding?

Kraft: Every two years a patron meeting is held and patrons decide on this. Where we feel it is necessary, we will recommend, but it comes out of the patron fund so it's voted on by the patrons.

13. How can we find out if our verterinarian knows how to take an accurate scrotal measurement and semen evaluation, and how are veterinarians addressing this problem?

Cates: Dr. Coulter and Dr. Ray Butler our extension veterinarians blitzed the Saskatchewan and Manitoba veterinarians, taking all the most recent material to them. Watch however, for interpretation differences. For example, when I look at a bull I am looking through the eyes of the person I am testing for. I am looking for the best bull and I am NOT looking for a bull to cull. If I can't feel confident a bull is okay, I put him in the questionable category. I don't look for bulls to cull and skim off the bottom because this approach lets a few questionable bulls through. If there's the slightest doubt, I flunk them. Others say, "If I can't find a reason to flunk them, they pass". I take the other side of the coin.

OVERVIEW OF NATIONAL BEEF SCENE AND CONFERENCE WRAP UP

Gary Jones, President, Canadian Cattlemen's Association

I got two key points from Don Robertson's talk on silage; the use of custom operators, and clean fields. We can't afford to give all our income to the implement companies. Whether you do it co-operatively with neighbors or hire someone to come in and do it, custom operating or hiring is a good idea.

I like the idea that you can take wild oats and certain weeds out of crops. We've done it for years with balers, thrashed them out and left it back in the field, but they don't do the job that a forage harvester will do.

Doug Wotherspoon's operation is cost efficient, and that is dear to my heart. If producers are going to survive in this industry, we're going to have survive in a very cost competitive way.

Dr. Christensen's talk on minerals told me he thinks we should get our feed analyzed, take the anlaysis to someone for help to find out what we're short. I think if we all did more of that we'd do a better job.

I liked Ted Perrin's objective presentation. It's a good explanation of why different programs suit different operations. I wouldn't consider running a heifer over until she's a two-year-old before I bred her. It doesn't suit my operation, but it suits his. There is no man who can stand up and say one is right and the other's wrong.

One of the things that's bothered me in the last little while is this nonsense you hear about weaning 600, 700, 800 and 900 pound calves. I think Ted explained it very well. If you can get a 500 pound calf at five and one-half months, that's the most efficient thing you can do. Nutritionists will tell you the highest priced way you can possibly put weight on a calf, after his rumen has started to work and he's 400 or 500 pounds, is running it through a cow and then back into that calf.

Cattle feeding tests I have done show the lighter the calf, the better the feed conversion. We use the rule of thumb, about one pound more feed than the calf's weight per pound of gain. A 400 pound calf will convert about five pounds of feed to one pound of gain; a 500 pound calf about six to one and once you get to 1,100 to 1,200 pounds, they need 12 to 13 pounds of feed per pound gain.

Dr. Cates and Dr. Manns both emphasized a shorter breeding period. We do not use a 42 day breeding season on our cows, we use 48. We found when we used A.I., some cattle cycle on 24 days and on a 42 day system we missed some cows. Maybe there's something detrimental to a long cycle and maybe the 42 day deal has some merit, but we don't use it.

The most important 90 days in a cow's year is the 90 days after the calf is born. We're very careful what we do with our cows after the calves are born. We feed no hay; we feed by-products from grain because they are the cheapest. I try to have some alfalfa brome hay for right after calving. We start to calve in April in our cow herd, the last week of March with our two-year-olds. I feed the heifers well and I also like to put a lick tank out for the ones that have calves on them to supplement them.

What about the cost? Like Ted Perrin says, "Is the cost worth getting that extra calf." I think so; he doesn't. His operation is different than mine. His costs are different than mine. Regardless of the system that 90 days is the most important 90 days of the year in the reproduction of the cow.

The major point that the two doctors were making is that there's no total evaluation technique available today for fertility.

Dr. Red Williams explained simply and quickly, the hard realities that we are in a world marketplace and must have the cheapest priced commodity, considering quality if we are going to sell. We must keep our cost of production in line. If the future holds any light for us at all, we have to keep our production costs in line. He said a fair amount about the use of computers. I've fed cattle across the line and in Alberta and Ontario. All had computers so I've done a lot of analysis on computers. They have a very important role in feedlots and they have an important role in the purebred industry.

One thing I see in the U.S. and not in Canada is that every agricultural bank of any substance will have an ag computer program you can use. You can take your feed records in once a week and get a print-out sheet. They are usually hooked up with some cattle feeding organization or ranching organization and the software is available so you can compare and find out why your costs are out of line with what others are doing.

I think our banking organizations need to be shaken up a little bit.

Another source of computer help in the U.S. is accountants. Many accountants have completed programs for their clients. However, I don't think the average farmer has a use for a computer, but I do see some merit in some of these telephone hookups that are going to be available soon.

It's an area I'd go slow on. I've had some buying experience. We've bought two with the Cattlemen's Association in the last 10 years and they're obsolete in 12 months. There's something that does a much better job for less by the time you learn to run the first one. It's a fast moving technology and one you want to be careful of.

Mark Kilcher, bless him. He'll restore your faith in the civil service. I know in my operation I have used the research station a lot and Mark Kilcher has helped me, possibly because I feel so keenly about the deterioration of the prairie grass. He's a world of knowledge.

Producer security is an issue we have worked on in the Cattlemen's Association and it's a problem because of the different laws from province to province. I have spoken about the changes in the bank act which we asked for and didn't get. I appreciated Gordon's talk.

Stuart Macdonald put on an excellent demonstration in video sales. I haven't sold cattle that way, but I feel strongly that every option possible must be open to producers in marketing their product, especially beef cattle. Because cattle are not pigs, they are not chickens, they are not uniform. We raise cattle that weigh 1,600 pounds and we have heifers that are fat at 750 pounds. We have bulls, cows and veal calves. Every possible marketing option is necessary. This is a good one, a new one. It may be slow to catch on.

Mr. Macdonald mentioned electronic auctions. I sell cattle in eastern Canada on OLEX (Ontario Livestock Exchange). I like it. The marketing cost is between $2.50 and $5. a head depending on your volume. You can turn down the bid. If you don't know how to explain your cattle the first few times, someone from OLEX will come out and go through your cattle with you and help you learn to describe your cattle better. Every option is necessary. I'd ask you to support the Saskatchewan Wheat Pool in their attempts to bring one more key element that could reduce costs significantly by having pre-conditioned calf sales, shipping direct to the end user taking the sickness and stress out of some of these cattle.

In that regard I'd like to say something else. I know you've heard a lot about these calves should be finished out on the farm on which they were born and raised. If we have one competitive edge in the beef cattle business, it's that our cattle eat by-products, frozen crops, spoiled crops, corn stalks and many things that have absolutely no value in any other way. And, if the rumen is going to compete, he is not going to compete when you squeeze him down and say he must be raised on the farm of origin and he's not allowed to be used as a vulture or a scavenger to clean up the by-products he's so adept at. The only real place the beef cow excells, is turning high cellulose materials into high priced protein fit for human consumption.

Dr. Coulter impressed me with figures. Fertility is five times as important as growth rate is, and ten times as important as carcass quality.

The level of energy ration in bulls was a terrible shock for me. I saw the first figures where Angus bulls only lost 7 per cent and nobody ever sent me the second report and I've been telling everybody how Angus could really take the grain and not drop in reproduction activity.

The panel was excellent.

<u>The outlook of the beef industry</u>

January 1, 1983 was the 10th year in history in which Canada's total number of cattle continued to drop. We have 11.6 million cattle in Canada, the lowest since 1968. We have 1.74 million dairy cows, the lowest ever since we kept records. That gives us 5 million cows, the lowest cow numbers since 1950. We know there's less than that because the supply management liquidated 100,000 cows in the first six months of 1983, so the dairy industry dropped that much more and we don't know about beef. We have a high ratio of female slaughter to steers or bulls, 105:100. About 98 or 97 will keep you equal.

Per capita consumption this year is about 91 pounds. It was 90 pounds in 1982. We produced 91 pounds of beef and exported net net to the U.S., $200 million over and above what we imported from them. That means $9 out of $100 was an American dollar. Total consumption figures puts us at about even keel. We exported more to the Americans than we imported from Australia and New Zealand.

If the American economy continues to rebound as it has in the last little while, we will likely stop the kill-down of our beef herd and if we do that we will probably short the supply of beef by close to five pounds. This isn't a solid fact, but we might increase carcass weight by a few pounds, not kill as many cattle as veal calves, so we might not short the market but it is a real possibility.

The industry is far more business oriented than it was 10 years ago. Better management. We're moving up

calving percentages, more weight per day of age. You don't need as many cows when you're cranking the calves out and getting them out at 1,100 to 1,200 pounds at 12 or 13 months of age. You've got a catch-up period when you move to yearlings from calves and that's why we've done it in the last few years and why we have fairly high beef supplies right now. Less death loss because you can't afford them and larger heifer carcass weights. This is the effect of the exotics or continental breeds. The cattle will carry on to higher weight and still meet our grading criteria.

But we have a mature industry. We are not going to have the growth we had in the past. You know the work we've done with our Beef Information Centre.

I think the day of 115 or 120 pound consumptiuon of beef in Canada is gone forever. There are price limitations. We won't get that far out of line with pork or chicken. We will always sell at a premium. It is a better product. But that premium has limitation and it is tied to the economy more closely than we ever thought before.

That's the one thing that we as the Canadian Cattlemen's Association or anyone else cannot project, is demand. We've been close on production, but how do you estimate demand.

When you think of all those figures, you can see it in your mind. The pot of gold is just there at the end of the rainbow. And it is close. But you want to remember, there's always governments. In my opinion the cow-calf producer or feeder producer has got excellent times ahead of him. The cattle feeder will once again have to be one of the most astute businessmen in Canadian agriculture because we are going to have more dollars chasing fewer calves than ever before. And the great old worry that every old cattleman has is hanging over our heads again, and that's a fairly substantial drop in feed grain prices. Of all the wrecks I ever knew, the worst ones were right after those give-away prices we always face in feed grains every few years. We saw it in the early '50s and blamed it on foot and mouth and we saw it in the middle '70s.

I looked in the paper just before I came here and the U.S. futures on corn is 60 cents a bushel, almost 20 per cent less for December than for March. The PIK program did short the market this year, did cause strength in the market. The U.S. government has decided that that program only transferred income to Canada, Brazil, Argentina, and Australia. And there's much speculation that the U.S. will seed fence corner to fence corner and a lot of that land sat a year off.

The U.S. dairy policy is not going to kill as many cows as we thought. We estimate that 335,000 dairy cows are going to die, 100,000 are dead already. We shouldn't see much effect on the marketplace in the short term. But remember July 1, 1984, January 1, 1985 and July 1, 1985 that support price is going to drop. And it's going to continue dropping until it's in line with what the consumer wants to pay.

Canada is now a dumping ground for European beef. Last year Denmark was cut off because of health reasons. They are now reinstated. The U.S. has decertified 12 or 14 countries. That beef will come to Canada because we are the only cash market left. We do have a beef import law with Australia and New Zealand, but we have no protection from these other countries. The Cattlemen's Association has a big job ahead of them.

I hope I haven't thrown too much cold water on the best scenerio this industry could have thought it would be in a few months ago. One of the things that is really key to me is that we've had such an increase in by-products, hides and other things, that we haven't had to pass on all the cost increases to consumers and although we are $10 a hundredweight higher than we were this time a year ago, our consumers are getting a good buy in their beef products. I believe some growth could occur but beef has to grow in line with the growth of our population and the growth of our foreign markets. But if government decide to rebuild the beef herd with an artificial stimulus then all bets are off.

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